SITE INSPECTION REPORT

HILL BROTHERS CHEMICAL COMPANY

4450 North 42nd Avenue

Phoenix, Arizona 85019

Maricopa County

EPA ID# AZD008397242

STATE ID# 329

Prepared by:

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Arizona Department of Environmental Quality

Office of Water Quality

Groundwater Hydrology Section

Site Assessment Unit

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THE GROUNDWATER SAMPLE RESULTS HAVE NOT BEEN RECEIVED AT THE TIME THIS REPORT WAS WRITTEN, THEY WILL BE FORWARDED TO EPA AS AN ATTACHMENT UNDER A SEPARATE COVER.

APPENDICES

1.0 SITE DESCRIPTION:

A Preliminary Assessment (PA) of the Hill Brothers Chemical Company was completed by Arizona Department of Environmental Quality (ADEQ) for the EPA on March 24, 1989. The PA recommended that a Site Inspection be conducted at this facility since some possibility existed that a release to the environment by contaminants may have occurred. (1)

The purpose of this Site Inspection report is to summarize investigative efforts (including groundwater, soil, and soil gas sampling) and make recommendations for further action.

The Hill Brothers Chemical Company is located at **4450 N. 42nd Avenue, in the city of Phoenix, Arizona.** The facility is located within the NW 1/4/, SW 1/4/, Township 2 North, Range 2 East, Section 22 [(A-02-02)22cb]. The Hill Brothers Company operates a chemical distribution facility which receives chemicals by tanker truck and railroad cars. The chemicals are pumped into tanks on the site for storage and transferred into containers for distribution. The chemicals handled at Hill Brothers include acids, bases, solvents, and concrete additives. See Figures 1 and 2. (2)

The Hill Brothers facility was built in 1969. Prior to 1969, this area was agricultural. The business and land owner of this facility is Hill Brothers Chemical Company which is based at 1675 N. Main Street, Orange, CA. 92667. The current president and director of the company is C. Dean Hill. The Hill Brothers Company employs 17 people at this location and the site occupies 4.2 acres. The Hill Brothers facility contains a warehouse (16,833 sq.ft.), covered packaging area (2,836 sq ft), covered dock area (2,300 sq ft), chlorine building (2,836 sq ft), covered chlorine area (1,230 sq ft), amd office area (2394 sq ft). Public access to the facility is restricted. The facility is surrounded by a locked chain link fence and public access is limited to the office area. See Figure 3. (2)(3)

Hill Brothers is bordered on the north by Hogon Manufacturing (no longer in operation); the east by 42nd Avenue; the south by SRL Company; and the west by railroad tracks and 43rd Avenue. Hill Brothers is located in an industrial and commercial area in an urban setting. The land use in a three mile radius of Hill Brothers is mixed and includes industrial, commercial and residential uses. The nearest off site buildings are industrial business located adjacent to the Hill Brothers property line. The nearest residential area is located one-half mile to the west of Hill Brothers. The 1980 Census reports that Phoenix had a population of 927,965. (4) (5)

In a 1986 memo, Hill Brothers facility was recommended for a Preliminary Assessment by ADEQ. This recommendation was based on a Site Inspection Report, prepared by ADEQ in 1985, for the Phoenix Well # 71 Area which was identified as an area of groundwater contamination by VOC's. (6)

FIGURE 1

Location Map

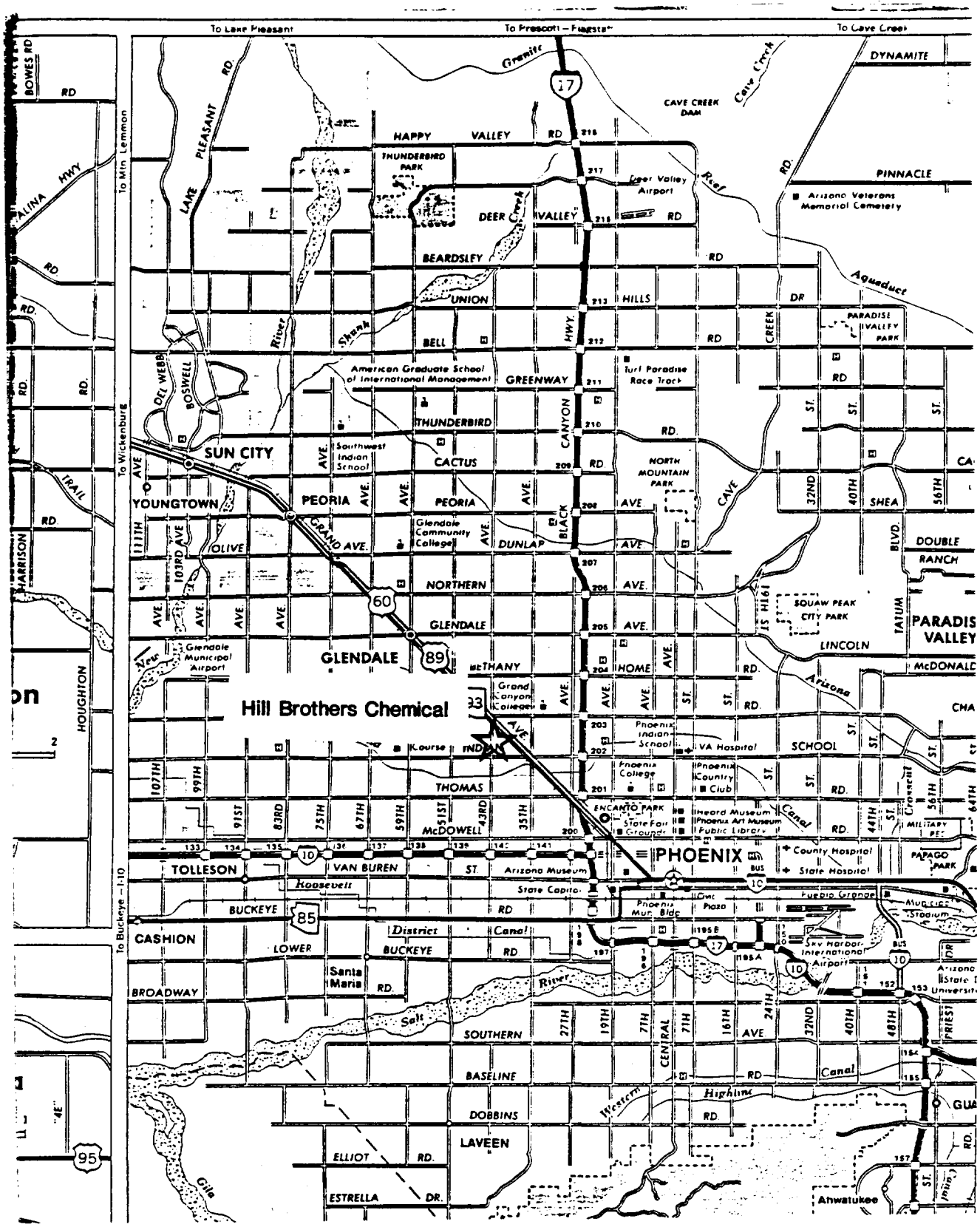
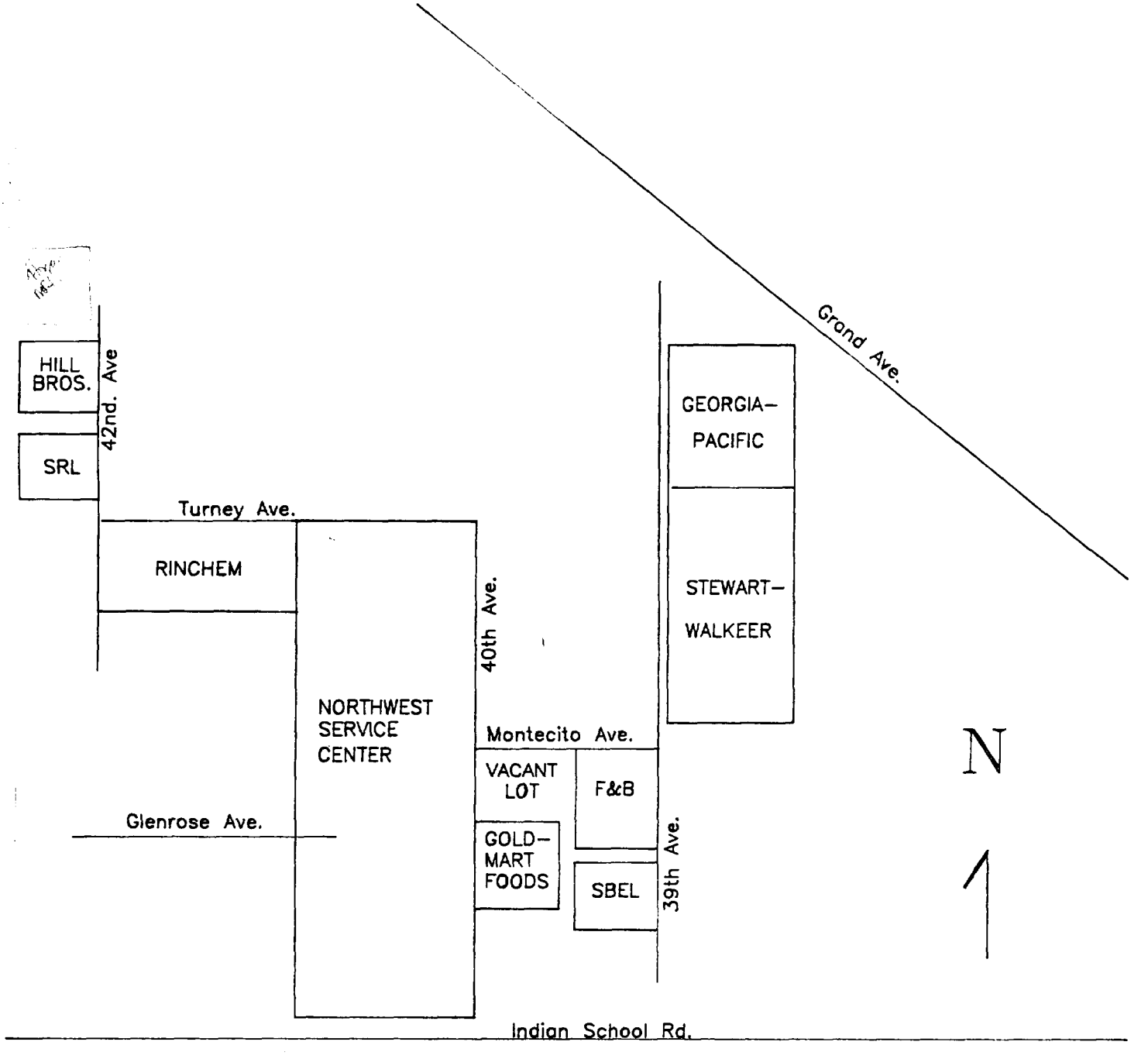
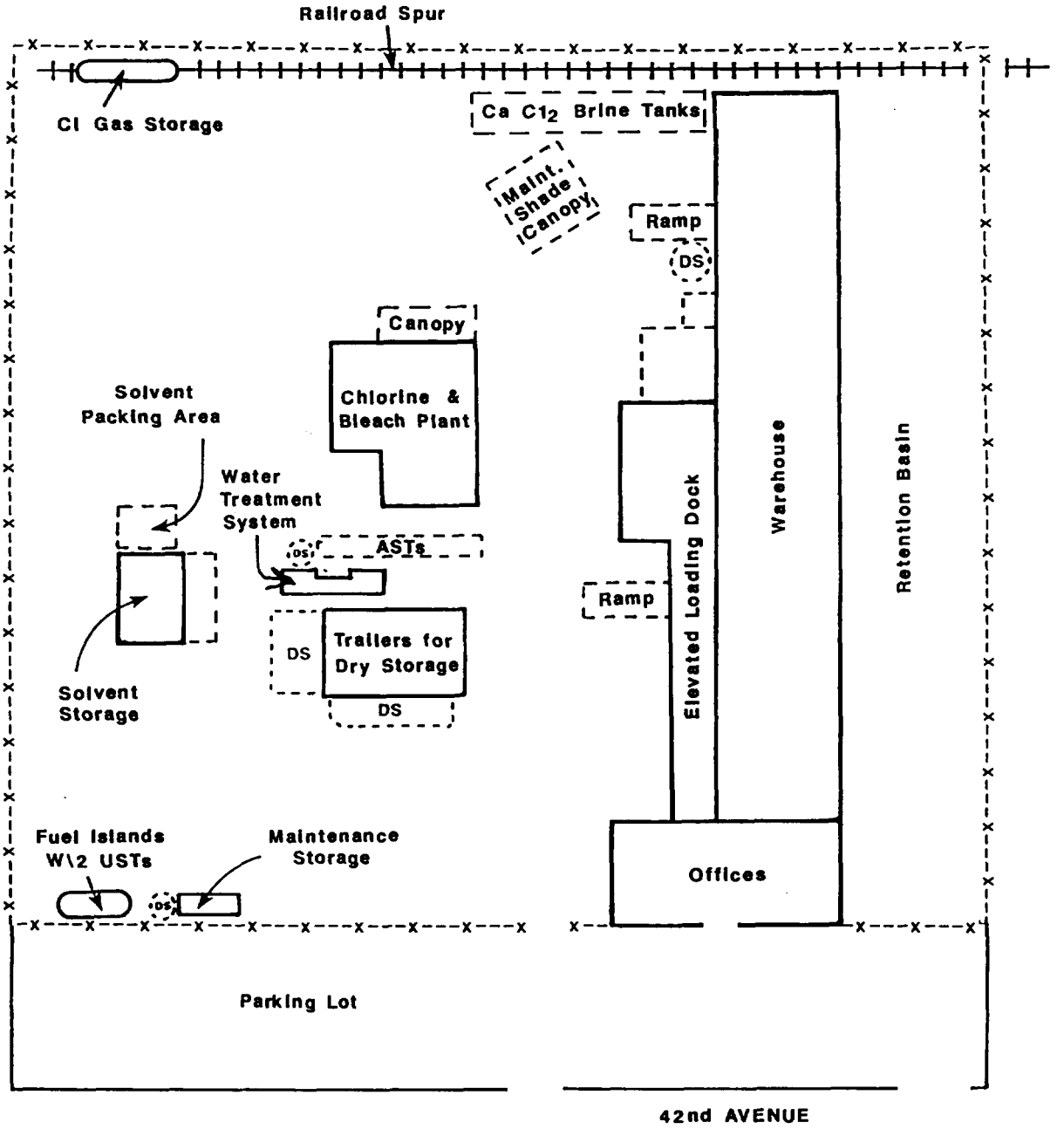


FIGURE 2
SITE MAP
(DRAWING NOT TO SCALE)



In addition, the Hill Brothers facility is located within the West Central Phoenix Area that was designated as a Water Quality Assurance Revolving Fund (WQARF) State Superfund site in 1986. The Hill Brothers facility was identified as being a potential source of the 1,1-dichloroethylene (1,1-DCE) detected in the groundwater of the study area based on the historical storage of the solvents on site. (7)

gure 3. Facility Map



Explanation:

-x---x- Fence

DS Drum Storage

ASTs Aboveground Storage Tank

NORTH

0 40 80 120

SCALE IN FEET

The Earth Technology Corporation

SITE PLAN
HILL BROTHERS CHEMICAL COMPANY
4450 North 42nd Avenue
Phoenix, Arizona 85019

2.0 APPARENT PROBLEM:

Volatile organic compounds (VOCs) were first detected in groundwater in the area, termed the West Central Phoenix area, in July 1982. The City of Phoenix detected trichloroethylene (TCE) in four municipal supply wells (Nos. 70, 71, 151, and 152). The Arizona Department of Health Services (AHS), Salt River Project (SRP), and the City of Phoenix confirmed the presence of VOCs in the groundwater with sampling in 1983, 1985, and 1986. (7)

The West Central Phoenix area was designated a Water Quality Assurance Revolving Fund (WQARF) State Superfund site in 1986. The area was defined for the purposes of the WQARF study by Camelback Road to the north, Interstate Highway (I-17) to the east, McDowell Road to the south, and 83rd Avenue to the west. (7)

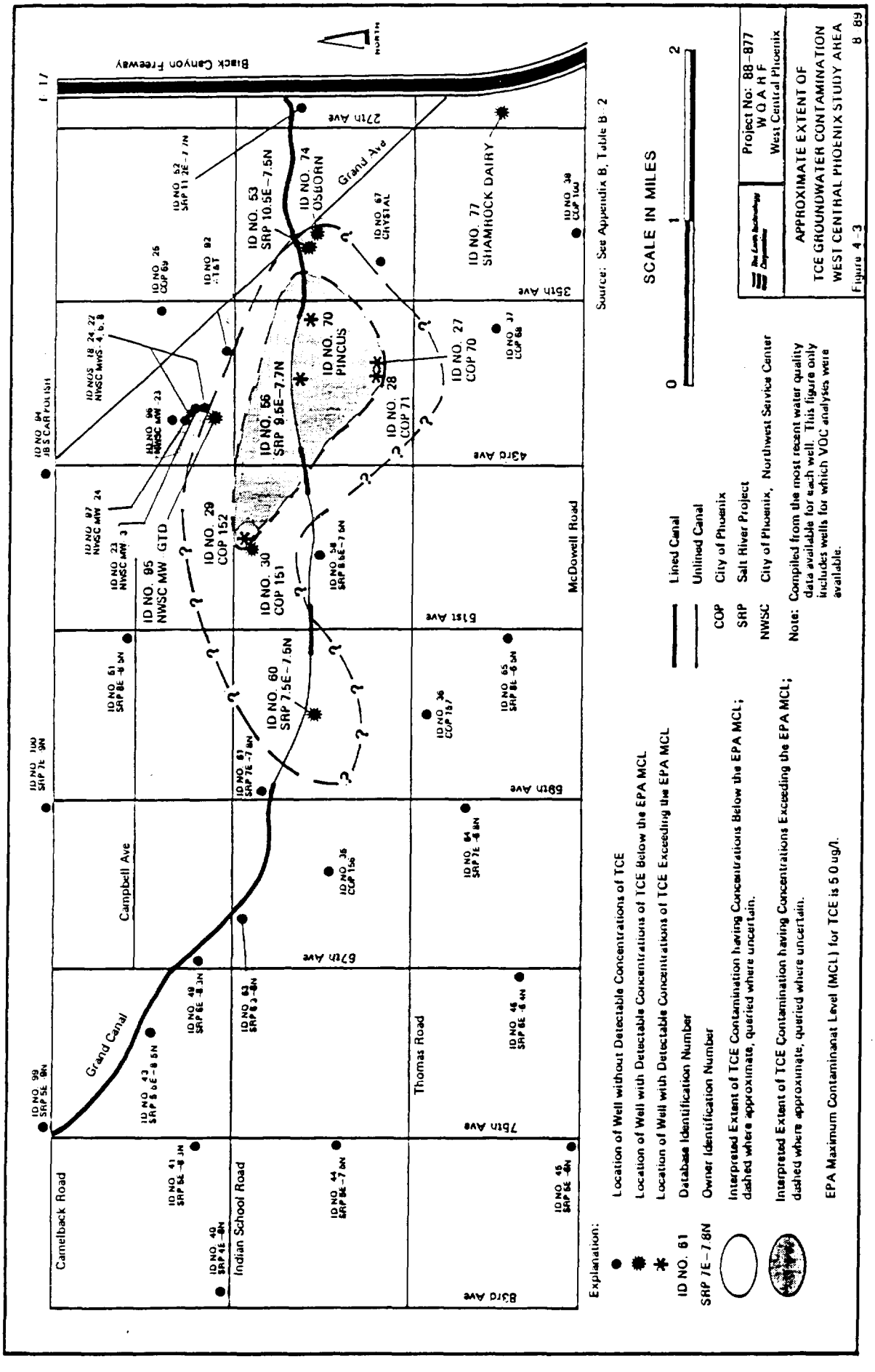
Under the WQARF program, the Earth Technology Corporation (ETC) received a contract from ADEQ to conduct a preliminary remedial investigation to assess the nature, extent, severity, and potential sources of volatile organic compounds (VOCs) detected in groundwater beneath the study area. (7)

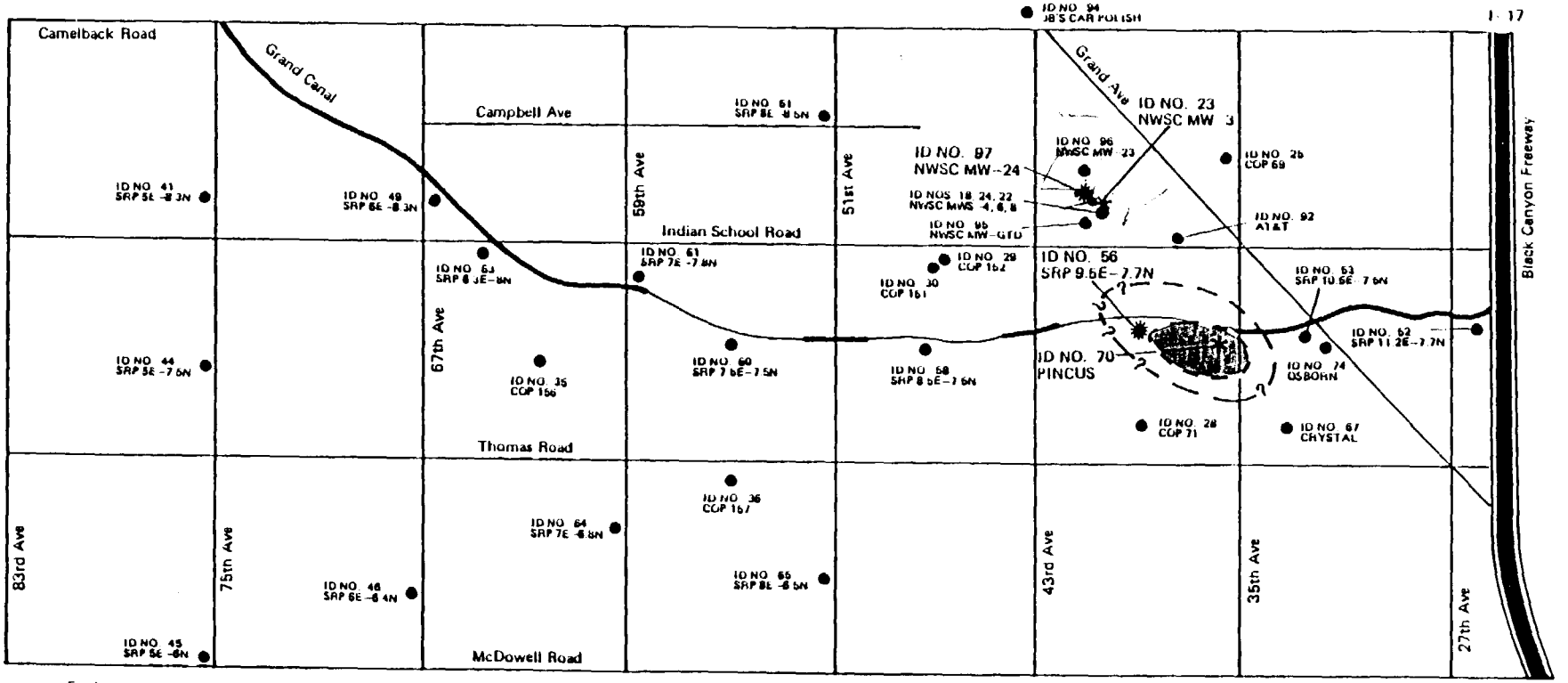
According to the Earth Technology Corporation report, groundwater contamination in the West Central Phoenix study area occurs in four distinct locations. One of these areas is a localized area of 1,1-dichloroethene (1,1-DCE) contamination in the northeastern section of the study area. The Hill Brothers. Chemical Company facility is located less than one-half mile north-northwest from the known area of 1,1-DCE contamination. See Figures 4 and 5.(3)

The 1,1-DCE was detected in groundwater samples collected from City of Phoenix Northwest Service Center (NWSC) monitoring well MW-24. The samples collected in March and September, 1988 had 1,1-DCE concentrations of 9.0 ug/L and 4.9 ug/L, respectively. The EPA MCL and Arizona Action Level for 1,1-DCE is 7.0 ug/L. (7)

In addition to MW-24, VOCs were detected in groundwater samples collected from four other NWSC monitor wells (Nos.3, 4, 6, and 8). These wells are located on the City of Phoenix NWSC property, as shown in Figure 6. Although 1,1-DCE was detected in NWSC MW-24, it was not detected in two additional monitoring wells located 800 feet north (NWSC MW-23) and 800 feet south (NWSC MW-GTD). Since all three wells are perforated at the same intervals, it appears the 1,1-DCE is not migrating on-site from these directions. The remediation currently underway at COP NWSC (pump and treat) may be influencing the groundwater flow direction in the area, and may be pulling 1,1-DCE into NWSC wells from the east, west or northwest. Hill Brothers. is located 0.5 mile north-northwest from the NWSC wells and could be influenced by the NWSC remediation pumping. (7)

Figure 4. TCE Contamination in West Central Phoenix





Explanation:

- ● Location of Well without Detectable Concentrations of 1,1-DCE
- ✹ Location of Well with Detectable Concentrations of 1,1-DCE Below the Arizona Action Level and EPA MCL
- ✱ Location of Well with Detectable Concentrations of 1,1-DCE Exceeding the Arizona Action Level and EPA MCL
- ID NO. 61 — Database Identification Number
- SRP 7E-7.8N — Owner Identification Number
- Interpreted Extent of 1,1-DCE Contamination having Concentrations Below the Arizona Action Level and EPA MCL; dashed where approximate, queried where uncertain.
- Interpreted Extent of 1,1-DCE Contamination having Concentrations Exceeding the Arizona Action Level and EPA MCL; dashed where approximate, queried where uncertain.

Arizona Action Level and EPA Maximum Contaminant Level (MCL) for 1,1-DCE is 7.0 ug/l

Source: See Appendix B, Table B-2

SCALE IN MILES

0 1 2

- Lined Canal
- Unlined Canal
- COP — City of Phoenix
- SRP — Salt River Project
- NWSC — City of Phoenix, Northwest Service Center

NORTH

Note: Compiled from the most recent water quality data available for each well. This figure only includes wells for which VOC analyses were available.

Project No: 88-877
WQARF
West Central Phoenix

APPROXIMATE EXTENT OF 1,1-DCE GROUNDWATER CONTAMINATION
WEST CENTRAL PHOENIX STUDY AREA
Figure 4.5 8/89

Figure 5. 1,1-DCE Contamination in West Central Phoenix

Samples were collected from these wells and submitted for analysis on 7/1/86. The results of these analysis are given below. (8)

Table 1. NWSC Sampling Results

	MW-3	MW-4	MW-6	MW-8
Methylene Chloride	830 ug/L	785	784	800
Acetone	685	520	470	540
1,1-DCE	51	---	---	---

The City of Phoenix NWSC is a vehicle service and maintenance operation located at 4019 West Glenrosa [(A-02-02)22ca and cd]. In May of 1986, a release of unleaded gasoline from one of the facilities underground storage tanks was discovered. It was estimated that 420,000 gallons of fuel was released to the subsurface. Both floating free product and a dissolved contaminant plume are present beneath the site. At the present time, product recovery and groundwater remediation are taking place. (8)

The COP response to the ADEQ's 1988 hazardous material questionnaire did not indicate the use of any chlorinated solvents at NWSC. However, a EPA Underground Storage Tank Notification Form submitted by the City of Phoenix for the NWSC, reports the presence of one-550 gallon steel solvent tank. Based on available data, unleaded gasoline does not contain 1,1-DCE or any chemicals that could degrade into 1,1-DCE. It appears that the NWSC may not the source of contamination detected in NWSC MW-24. Rather, 1,1-DCE appears to have migrated from off site. (7) (8)

Under laboratory conditions, both TCE and 1,1,1-trichloroethane (TCA) have been shown to degrade to 1,1-DCE. In addition, tetrachlorethene (perchloroethylene PCE) has also been shown to degrade to TCE, and sub-sequently to 1,1-DCE. Therefore, disposal of the primary solvents TCA, TCE or PCE could be the source of the 1,1-DCE in the groundwater. (7)

As mentioned, Hill Brothers Chemical Company is located less than one-half mile mile north-northwest of NWSC. The Hill Brothers Chemical Company is a wholesale distributor of industrial chemicals. Operations at this facility include the storing, manufacturing and repackaging of chemicals to sale. This facility reports that they transport and store hazardous substances, but do not generate, treat, or dispose of hazardous wastes. Table 2 lists the facility's current hazardous materials inventory on site. This list includes: acids, alcohols, acetone, methylene chloride, PCE, toluene, TCA, xylene, and various other

HAZARDOUS MATERIALS INVENTORY STATEMENT
DATE: 14 SEPTEMBER 1988 UPDATE: 03 JANUARY 1989
BUSINESS NAME: HILL BROTHERS CHEMICAL
BUSINESS ADDRESS: 4450 N. 42ND AVE PHOENIX, AZ. 85019
SUBMITTED BY: EVERETT McLEAN, COMPLIANCE & SAFETY COORDINATOR
BUSINESS PHONE: (602) 272-9363

UN/NA NUMBER	DOT CLASS	CHEMICAL ABSTRACT NUMBER	CHEMICAL NAME COMPONENTS, CONCENTRATIONS	COMMON OR TRADE	MAX QTY ON HAND	MIN QTY ON HAND	UNIT MEAS	MAP LOC
UN 2789	CORR	00064197	ACETIC ACID		950	475	LBS	
UN 1463	OXY	01333820	CHROMIC ACID		5,400	500	LBS	
UN 1170	FL	00064175	DENATURED ALCOHOL	ETHYL ALCOHOL	700	165	GAL	
UN 1773	N/A	07705080	FERRIC CHLORIDE		880	55	GAL	
UN 1230	FL	00067561	METHANOL	METHYL ALCOHOL	2,000	200	GAL	
UN 1193	FL	00078933	METHYL ETHYL KETONE	MEK	700	165	GAL	
UN 1789	CORR	07647010	**HYDROCHLORIC ACID**	MURIATIC ACID	10,000	4,000	GAL	
UN 1090	FL	00067630	ACETONE		600	100	GAL	

Table 2. Hazardous Material Inventory

Bold Type indicates an Extremely Hazardous Chemical

Table 2. Hazardous Material Inventory

UN/NA NUMBER	DOT CLASS	CHEMICAL ABSTRACT NUMBER	CHEMICAL NAME COMPONENTS, CONCENTRATIONS	COMMON OR TRADE	MAX QTY ON HAND	MIN QTY ON HAND	UNIT MEAS	MAP LOC
UN 1005	NFG	07664417	**ANHYDROUS AMMONIA**		90,000	30,000	LBS	
UN 2672	CORR	01336216	**AMMONIUM HYDROXIDE**	**AQUA AMMONIA**	3,000	750	GAL	
N/A	N/A	N/A	BRIGHT DIP		100	0	GAL	
UN 1748	OXY	07778543	CALCIUM HYPOCHLORITE	PITTCHLOR	30,000	4,000	LBS	
UN 1824	CORR	01310732	SODIUM HYDROXIDE	CAUSTIC SODA FLAKE	60,000	12,000	LBS	
UN 1824	CORR	01310732	SODIUM HYDROXIDE	**CAUSTIC SODA LIQUID**	30,000	7,000	GAL	
UN 1017	NFG	07782505	**CHLORINE GAS**		500,000	160,000	LBS	
UN 1791	CORR	0781529	SODIUM HYPOCHLORITE		8,000	1,000	GAL	
UN 1789	CORR	07647010	H.B. CONCRETE REMOVER	MURATIC ACID	150	0	GAL	
UN 1773	N/A	07705080	FERRIC CHLORIDE		880	55	GAL	

Bold Type Indicates an Extremely Hazardous Chemical

UN/NA NUMBER	DOT CLASS	CHEMICAL ABSTRACT NUMBER	CHEMICAL NAME COMPONENTS, CONCENTRATIONS	COMMON OR TRADE	MAX QTY ON HAND	MIN QTY ON HAND	UNIT MEAS	MAP LOC
UN 1219	FL	00067630	ISOPROPYL ALCOHOL		800	165	GAL	
UN 1789	CORR	007647010	HI SOL	MURATIC ACID	1,375	0	GAL	
UN 1789	CORR	07647010	**HYDROCHLORIC ACID**	REAGENT MURATIC ACID	36	0	LBS	
UN 1593	N/A	00075092	**METHYLENE CHLORIDE**	DICHLOR-METHANE	2,000	400	GAL	
N/A	N/A	N/A	NEUTRAL CHROMATE	H.B. #222	55	0	GAL	
UN 2031	OXY	07697372	**NITRIC ACID**		4,500	1,000	GAL	
N/A	N/A	00144627	OXALIC ACID		2,200	330	LBS	
UN 1897	N/A	00127184	**PERCHLORO-ETHYLENE**	TETRACHLO-ROETHYLENE	20	55	GAL	
UN 1805	CORR	07664382	PHOSPHORIC ACID	75%	1,400	250	GAL	
UN 1805	CORR	07664382	PHOSPHORIC ACID	85%	600	150	GAL	

Table 2. Hazardous Material Inventory

Bold Type Indicates an Extremely Hazardous Chemical

Table 2. Hazardous Material Inventory

UN/NA NUMBER	DOT CLASS	CHEMICAL ABSTRACT NUMBER	CHEMICAL NAME COMPONENTS, CONCENTRATIONS	COMMON OR TRADE	MAX QTY ON HAND	MIN QTY ON HAND	UNIT MEAS	MAP LOC
UN 1840	CORR	01310732	POTASSIUM HYDROXIDE	CAUSTIC POTASH	10,000	1,200	LBS	
UN 1490	OXY	07722647	POTASSIUM PERMANGANATE		6,000	1,000	LBS	
UN 1789	CORR	07647010	#241 SCALE SOLVENT	INHIBITED MURIATIC ACID	300	60	GAL	
UN 1079	NFG	07446095	SULFUR DIOXIDE GAS		8,000	4,000	LBS	
UN 1830	CORR	07664939	**SULFURIC ACID 93-95%**		10,000	4,000	GAL	
UN 1830	CORR	07664939	**SULFURIC ACID 40%**		10,000	2,000	GAL	
UN 1830	CORR	07664939	**SUFURIC ACID**	REAGENT	700	100	GAL	
UN 1294	FL	00108863	TOLUENE		500	150	GAL	
UN 2831	N/A	00071556	1,1,1, TRICHLORO-ETHANE		6,000	1,000	GAL	
UN 1307	FL	01330207	XYLENE		500	150	GAL	
N/A	N/A	N/A	CLASSIC COATING LACQUER		300	40	GAL	

Bold Type Indicates an Extremely Hazardous Chemical

UN/NA NUMBER	DOT CLASS	CHEMICAL ABSTRACT NUMBER	CHEMICAL NAME COMPONENTS, CONCENTRATIONS	COMMON OR TRADE	MAX QTY ON HAND	MIN QTY ON HAND	UNIT MEAS	MAP LOC
N/A	N/A	N/A	HICO WATER REPELLENT		300	15	GAL	
N/A	FL	N/A	PAINT/DESERT BRAND THINNER	SEALER SOLVENT	50	10	GAL	

Table 2. Hazardous Material Inventory

chemicals. The hazardous materials inventory has not significantly changed over time. Hill Brothers reports they do not dispose of, or manifest hazardous wastes from this facility. They are required, by the City of Phoenix, to pre-treat wastes prior to discharge into the sewer system. This pre-treatment consists of an adjustment to neutralize pH prior to discharge. (4)

A review of ADEQ's Emergency Response Unit's Incident Reports indicate a potential for a release of hazardous substance to the environment in the past. In 1984, Hill Brothers had two spills on site: On April 11, an unknown amount of an acid was spilled and an unknown amount of ammonia was spilled on August 9. The ADEQ's Hazardous Materials Team responded to both of these incidents. In June of 1986, 300 pounds of chlorine was released at Hill Brothers. The City of Phoenix Fire Department responded to that incident. Most recently, on January 1, 1988, 7,000 gallons of sulfuric acid (40%) was spilled on site. The acid was contained and 95% of the spilled acid was recovered. (9)

In addition to the above incidents, a review of the City of Phoenix Fire and Industrial Waste Water Departments records indicate that in 1985 the Fire Department responded to Hill Brothers on six separate occasions. These incidents were due to exposures of hazardous materials, leaking storage containers, and contamination of the city sewer system. At two of these incidents, evacuation of nearby businesses was required due to high concentrations of chlorine gas at the Hill Brothers facility. (10)

3.0 HRS FACTORS

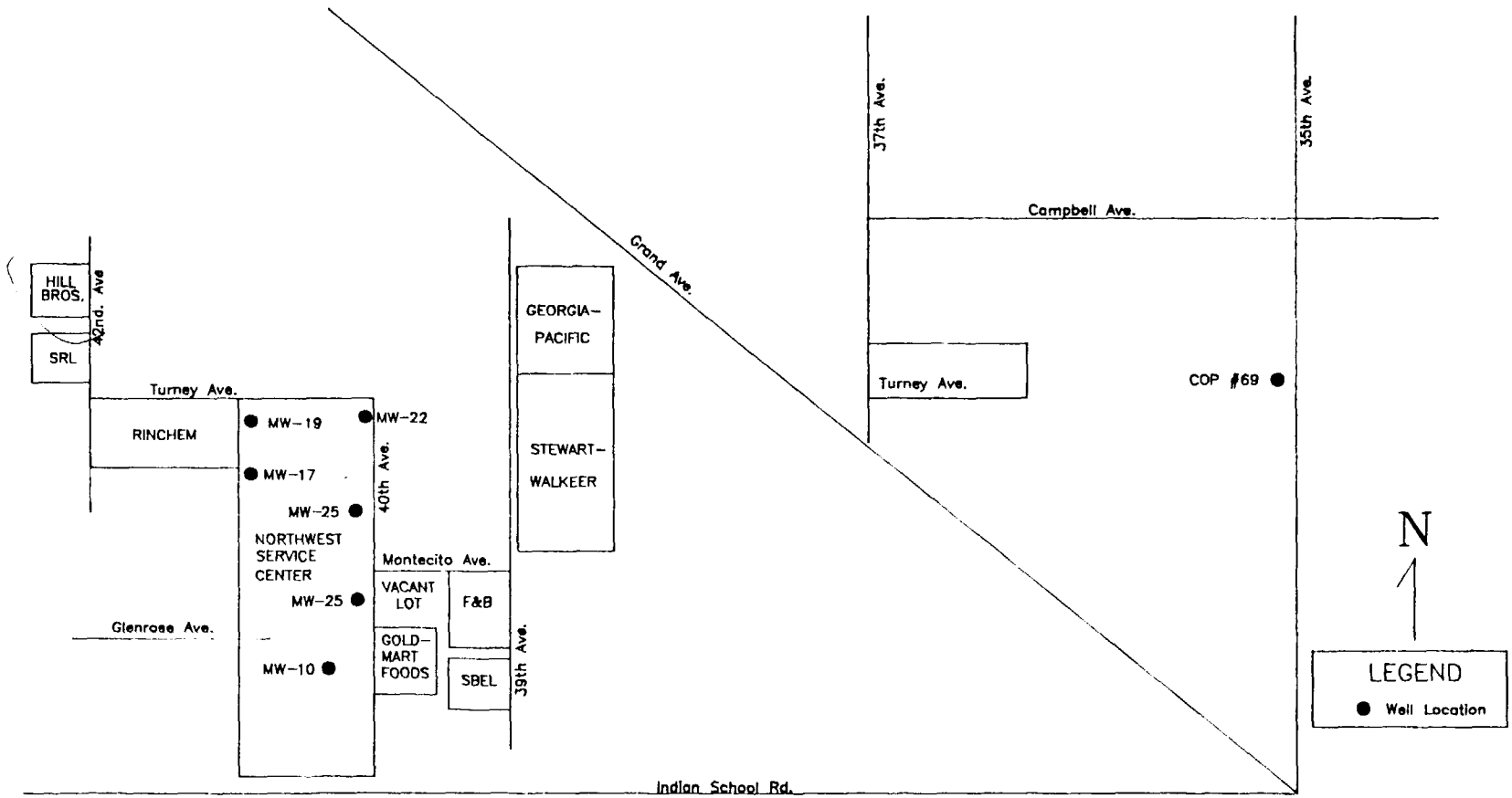
3.1 OBSERVED RELEASE

An observed release to the groundwater has not been documented at the Hill Brothers facility. However, elevated levels of VOCs (PCE, 1,1-DCE, TCE, AND TCA) were detected in soil gas samples obtained from five locations on the facility. The VOCs were detected in the soil gas samples collected at 5 to 15 feet below the facility. Hill Brothers is located less than 0.25 mile from COP NWSC MW-24 where 1,1-DCE was detected in the groundwater. The 1,1-DCE was also detected in the soil gas samples collected at the facility. Under laboratory conditions, both TCE and TCA have been shown to degrade to 1,1-DCE. In addition, PCE has also been shown to degrade to TCE and subsequently to 1,1-DCE. (4) (24) (25)

While the Hill Brothers facility is not located regional upgradient from the NWSC, the site's hydraulic and groundwater flow direction have not been determined. With

FIGURE 6

LOCATION OF WELLS SAMPLED



out this data, along with the results of the July 18, 1989 groundwater sampling at the NWSC, a conclusion regarding if an observed release has occurred at this facility, cannot be made. It is not clear if the VOC contamination of the unsaturated zone detected with the soil gas analysis has reached the groundwater. It is also undetermined whether this contamination is related to the 1,1-DCE contamination observed in the NWSC monitor wells. The soil gas samples collected at the Hill Brothers facility indicate significant VOC contamination of the unsaturated zone beneath the facility. Depth to groundwater at this site is approximately 115 feet. The potential for the VOCs in the unsaturated zone to reach the groundwater (if they have not already done so) is estimated as high, as detailed in Section 4.2.

An observed release to the surface water and the air has not been documented at the Hill Brothers facility. There is no surface water pathway present at this facility. However, the potential for an release to the air is present at this site as explained in Section 3.5.

3.2 WASTE TYPE/QUANTITY:

The Hill Brothers Chemical Company is a wholesale distributor of industrial chemicals. They report that they store, manufacture, and repackage chemicals for resale. Hill Brothers. reports that they transport and store hazardous substances. (4)

Hill Brothers. is required by the City of Phoenix to pre-treat waste water prior to discharge into the sewer system. The waste water is generated from the floor drains in the acid and caustic blending area and the return drum rinse area. The facility neutralizes the pH of the waste water prior to discharge. The wastewater treatment consists of a concrete pit with a series of four plastic tanks. The combined volume of these tanks is 2500 gallons. The wastewater is pumped through the tanks and the ph is neutralized prior to discharge into the sewer. A sample of wastewater is collected prior to discharge for analysis on a monthly basis. The COP requires a monthly analysis of wastewater for base metals. (4)

With the exception of the above treatment, Hill Brothers reports that they do not generate, treat or dispose of hazardous materials. Any possible release into the environment would be a result of a leak or spill of the hazardous materials during repackaging or leak of a storage tank. (4)

The hazardous substances used on this site (listed in Table 2) include: acids, sodium hypochlorite, sodium hydroxide, anhydrous ammonia, 1,1,1-TCA, PCE, and methylene chloride. The quantities of hazardous materials kept on site and the

storage location are also listed in Table 2. The Hazardous Materials Inventory (Table 2) lists the substances currently on site, the historical inventory has not significantly changed. (2) (4)

In addition to the above list of chemicals, Hill Brothers handles a line of concrete additives. These additives include accelerators (calcium chloride), water reducers, air entrainment, plasticizers, silica and reinforcing fibers. The chemical composition of these additives is not known.

Hill Brothers has a paint booth for painting drums for reuse. They report that they use the both latex water based paints and oil based paints. The filters from the spray paint booth are disposed of as solid waste. (2) (4)

Empty drums are returned to Hill Brothers by customers for reuse. These drums are rinsed and repainted prior to reuse. Hill Brothers reports that solvent drums are not reused, they are picked up by either Ted Levine Drum Co. (AZD072433816 or Rinchem (AZD980892731). **Hill Bros reports they do not accept returned drums if they contain a pourable liquid. However, it appears this policy** may not apply to **historical drum recycling at this facility.** A Notice of Violation letter was issued by the City of Phoenix to Hill Brothers, Sept 24, 1985 addressing elevated levels of heavy metals in the waste water discharged by the facility. **The heavy metals were chromium, cadmium, lead, and silver. The** City of Phoenix requested Hill Brothers provide a description of the violation, source of pollutants, and a corrective action plan. Hill Brothers reported the heavy metals were being discharged from a drum washing area used for rinsing reusable chemical drums. The source of the returned drums containing the heavy metals was determined to be plating shop customers of Hill Brothers. The Hill Brothers facility reports that they have not used the drum wash for any reusable containers from any of the plating shops since January 1988. Hill Brothers did not identify the type or contents of the drums that were found to contain heavy metals i.e. solvent or acid. (10)

Solid waste is hauled to a municipal landfill by a local waste hauler BFT. (4)

As previously mentioned in Section 2.0, there has been releases of hazardous materials on site. However it has not been documented if the hazardous materials released in these incidents migrated off site. All of the spills were cleaned up on site and no soil or environmental samples were taken by the facility. (4)

The hazardous materials on site are stored in either the large above ground storage tanks, the warehouse, covered packaging area, or the chlorine building. The facility is a mixture of areas of concrete, asphalt, dirt, and gravel. See the site inspection map for the detailed areas. The above ground storage tanks are equipped with cement berms around the tanks. (4)

A retention basin is located along the northern property line. The basin is approximately 60 feet wide and runs along the entire northern boundary of the facility. It is not apparent what area this detention basin collects drainage from. (4)

Toxicity and persistence data on the current chemical inventory on site ranges from 6 to 12. (11)

TABLE 3. TOXICITY PERSISTENCE VALUE

	Groundwater	Air
acetic acid	6	6
ferric chloride	-	-
methyl ethyl ketone	6	6
hydrochloric acid	9	6
acetone	6	6
anhydrous ammonia	6	9
nitric acid	9	9
perchloroethylene	12	-
sulfuric acid	9	9
toluene	9	6
1,1,1-TCA	12	6
xylene	9	6

Hill Brothers reports they have two-6,000 gallon underground storage tanks that contain diesel fuel at this facility. These tanks are currently in use at this facility. (12)

Table 2 and the facility map, Figure 3, list all above ground tanks and their contents that are currently located at this facility. The facility has two above storage tanks (each having a 3000 gallon capacity) which they reported at the site inspection of being no longer in use. These tanks were used for two years and were used to store TCA. However, in the Table of Hazardous Materials supplied by Hill Brothers they report a minimum of 1000 gallons of TCA is stored in the tanks. The TCA was transferred into 1, 5, and 55 gallon containers for resale. (4)

Hill Brothers has obtained the following permits: (4) (10)

City of Phoenix Industrial Wastewater Discharge Permit # 8809-1550
Air Pollution Control Permit # A8601089 from Maricopa County Air Quality

Hill Brothers is regulated by RCRA and is classified as a large quantity generator of hazardous waste due to their handling of large quantities of hazardous materials. (4)

3.3 GROUNDWATER:

Hill Brothers is located in the Western Salt River Valley, a broad alluvial basin within the Basin and Range physiographic province of the United States.

Crystalline rocks and sedimentary deposits in the Western Salt River Valley area are divided into six units: metamorphic and granitic rocks, extrusive rocks, red unit, and the lower, middle, and upper units of basin fill. Metamorphic, granitic, and extrusive rocks compose the mountains that border the basin and underlie the basin fill. These rocks form a virtually impermeable hydrologic boundary at the basin margins and beneath the basin fill. These rocks are the sources of most of the sedimentary deposits that fill the basin. The basin-fill units contain most of the groundwater in this area. The depth to bedrock (crystalline rock) is estimated to be greater than 1,500 feet. (13)

The main source of groundwater in the west-central Phoenix area is the valley-fill deposits of the West Salt River Valley sub-basin. The valley-fill deposits are extremely heterogeneous, but have been differentiated based on lithology. The units, in ascending order, are: the lower conglomerate unit, middle fine-grained unit, and upper alluvial unit, all of which are hydrologically interconnected to some degree. (14)

The primary source of groundwater in the area is the Upper Alluvial Unit, which consists of deposits of unconsolidated and weakly consolidated gravel, and, silt, and clay. The Upper Alluvial Unit extends across most of the West Salt River Valley and ranges in thickness from 1 to 1,200 feet. In the vicinity of Hill Brothers facility, this unit is estimated to be approximately 200 feet thick. (13)

The Middle Fine-Grained Unit is composed of middle to late Tertiary deposits consisting of interbedded sand, silt, clay, and evaporite. This unit is estimated to be between 350 to 450 feet thick in the area around Hill Brothers. This unit is generally considered an aquitard but does yield water from inter-bedded, coarser playa deposits and sandy horizons. The Lower Conglomerate Unit is composed of coarse-grained sand and gravel-cemented conglomerate and overlies the basement complex. Groundwater in this unit occurs in confined conditions. This unit is estimated to be more than 500 feet thick in this area. The basement complex is composed of granite, gneiss, and schist and is considered to be of no major significance as a source of groundwater. (13) (14)

Groundwater occurs generally under unconfined conditions in the area around Hill Brothers at depths ranging from 100 to 130 feet below surface. However, in localized areas, groundwater may occur under semi-confined, confined, or perching conditions due to the presence of fine-grained materials. (15)

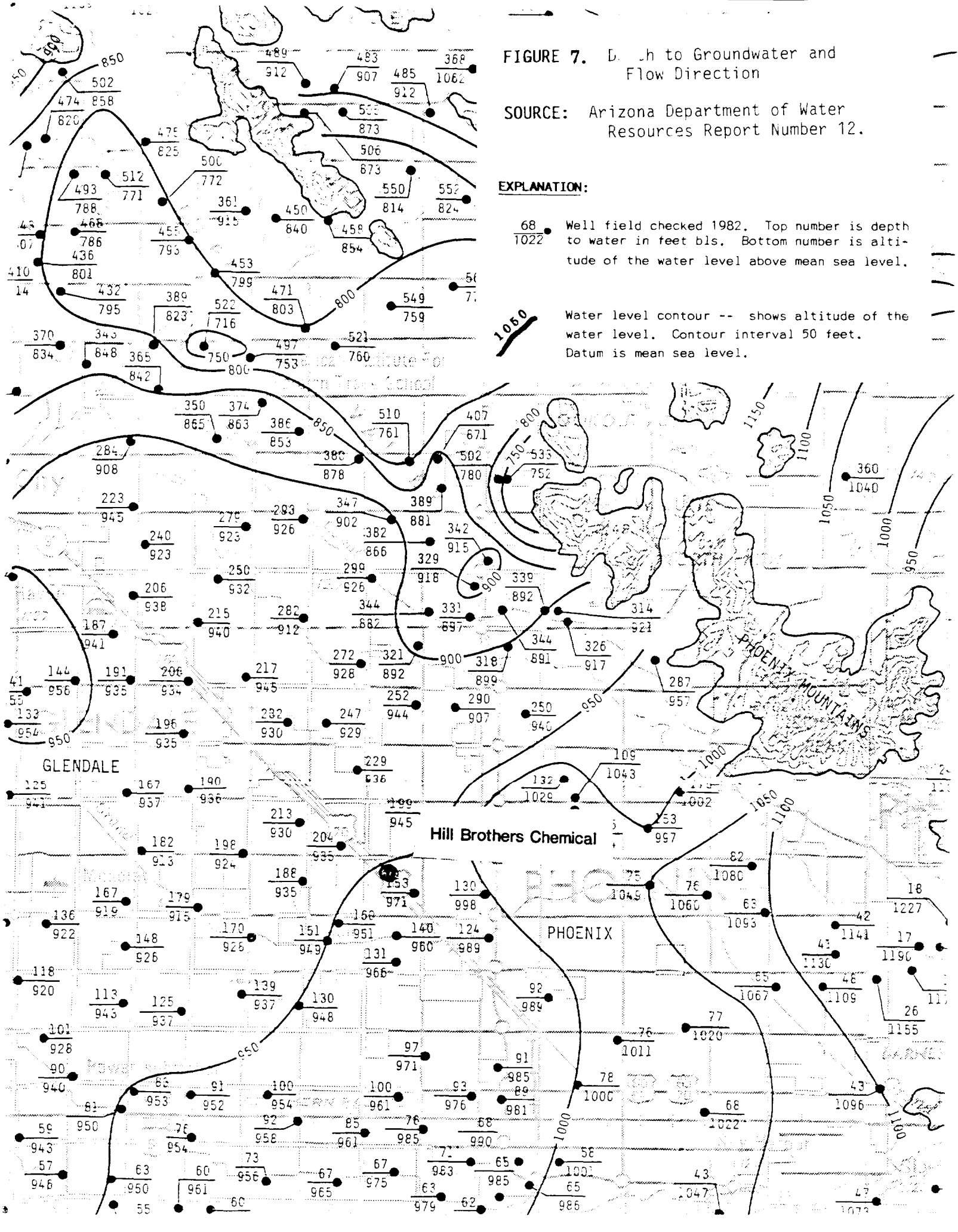


FIGURE 7. D. .h to Groundwater and Flow Direction

SOURCE: Arizona Department of Water Resources Report Number 12.

EXPLANATION:

68 / 1022 — Well field checked 1982. Top number is depth to water in feet bls. Bottom number is altitude of the water level above mean sea level.

1050 — Water level contour -- shows altitude of the water level. Contour interval 50 feet. Datum is mean sea level.

At the COP NWSC (located less than 0.5 mile south of Hill Brothers) groundwater occurs in unconfined conditions at a depth of 115 feet below land surface. (15)

Depth to groundwater within a three mile radius around Hill Brothers ranges from 72.5 feet below land surface (bls) two miles northeast, to 236 feet bls three miles to the north. The direction of regional groundwater flow was to the west-northwest in 1983. The regional groundwater gradient is approximately 0.002 (11 feet per mile). A groundwater contour map developed for the West Central Phoenix Study area by Earth Technology Corp.(ETC), indicates that groundwater flow may now be to the west-southwest based on 1987-88 water level data from COP and SRP wells. (7)

Pumping associated with the groundwater remediation at NWSC may locally alter the groundwater flow direction at the Hill Brothers facility. (7) (8)

As Figures 4 and 5 show, several areas of groundwater contamination have been documented in the West Central Phoenix Area. One of these areas is located south of Hill Brothers, but is interpreted to be a separate contaminant plume unrelated to the 1,1-DCE detected at NWSC monitor well #24. In the area contaminated by 1,1-DCE (Figure 5), only the upper alluvial unit is thought to be affected. (7)

There are approximately 132 wells registered with the Arizona Department of Water Resources within a three mile radius from the Hill Brothers facility. Groundwater from these wells are used for the following purposes: 22 public drinking water; 8 domestic; 22 irrigation; 7 test, and 54 for monitoring in accordance with various environmental programs. The use of the last 19 wells is variously: unknown, unused, or used for cathodic protection. See Table 4. (16)

The closest irrigation or drinking water well to the Hill Brothers site is City of Phoenix public supply well #69 [(A-02-02)22daa], located approximately 0.5 mile to the west. Groundwater from the City of Phoenix public supply wells is blended together with surface water to serve the Phoenix metropolitan area. The target population for drinking water wells within a three mile radius of Hill Brothers is 927,965, based on 1980 census figures.(5) (16)

The surface soil deposits in the area around Hill Brothers belong to the Gilman-Loam Association and consist of deep, well-drained soils formed in recent alluvium. The alluvium was derived from andesite, basalt, schist, rhyolite, and granite-gneiss. Permeability of this surface soil is rated as moderate. (17)

Well drillers logs for wells in the area characterize the unsaturated zone as silty fine-grained sands, clays and gravel. There does not appear to be a continuous clay layer

TABLE 4.

LOCATION OF REGISTERED WELLS WITHIN A THREE MILE RADIUS OF Hill Brothers Chemical

Source: ADWR Data Base

WELL LOCATION	ADWR WELL REGISTRATION	USE	DATE DRILLED	DEPTH WELL	WATER LEVEL	DATE MEAS.
(A-01-02)01aab	55-617310	C	--	650		
(A-01-02)01bda	55-801094	I	1959	704		
(A-01-02)01cac	55-801093	I	1939	790		
(A-01-02)01cbb	55-629584	I	--	--		
(A-01-02)01dcc	55-520257	M	1988	110		
(A-01-02)01dcc	55-520258	M	1988	120		
(A-01-02)01dcc	55-520259	M	1988	120		
(A-01-02)01dda	55-507099	M	1984	200		
(A-01-02)02bcc	55-626533	P	--	--		
(A-01-02)02caa	55-522458	C	1989	260		
(A-01-02)02cad	55-086545	C	1980	150		
(A-01-02)03abb	55-602408	H	1912	--		
(A-01-02)03abd	55-522457	H	--	--		
(A-01-02)03dad	55-522457	C	1989	260		
(A-01-02)04baa	55-641463	I	--	--		
(A-01-02)09aaa	55-520623	M	--	--		
(A-01-02)09aaa	55-520624	M	--	--		
(A-01-02)09aaa	55-520625	M	--	--		
(A-01-02)09aaa	55-520626	M	1988	119		
(A-01-02)09aaa	55-607201	I	1957	500		
(A-01-02)10	55-803793	H	1973	123		
(A-01-02)10aba	55-607200	I	1943	454		
(A-02-02)08aa	55-800888	N	1950	400		
(A-02-02)09add2	55-608375	I	1963	1002	225.5	1984
(A-02-02)09bad	55-604116	P	1958	1955	200	1981
(A-02-02)10da	55-639878	--	--	--		
(A-02-02)11bbb	55-518129	M	1987	55	dry	
(A-02-02)13dcc	55-617702	U	1924	202		
(A-02-02)14cbc2	55-608376	I	1948	702	163.7	1988
(A-02-02)14dbb	55-626559	P	1954	602	157.7	1987
(A-02-02)15dca	55-626554	P	1959	1200	174.4	1987
(A-02-02)16bbc	55-604776	U	1952	650	75.3	1986
(A-02-02)16dbb	55-634575	H	1949	--		
(A-02-02)16dda	55-086999	H	1981	510		
(A-02-02)16ddd	55-604114	P	1950	1300		
(A-02-02)17acb	55-608383	I	1962	1570	75.3	1986
(A-02-02)17ada	55-608382	I	1929	454	75.3	1986
(A-02-02)18ddd	55-607674	I	1929	390	168.9	1988
(A-02-02)19bba	55-522463	N	1989	260		
(A-02-02)20add	55-608372	I	1949	700	235.6	1986
(A-02-02)22add	55-634633	H	1979	500		
(A-02-02)22cab	55-523286	M	1989	140		
(A-02-02)22cac	55-521983	M	1988	135		
(A-02-02)22cac	55-522164	M	1988	155		
(A-02-02)22cac	55-522165	M	1988	155		

P = public supply, H = domestic, I = irrigation

M = momitoring, T = test, -- = unknown

C = cathodic, N = non use, U = unused

TABLE 4.

LOCATION OF REGISTERED WELLS WITHIN A THREE MILE RADIUS OF Hill Brothers Chemical

Source: ADWR Data Base

WELL LOCATION	ADWR WELL REGISTRATION	USE	DATE DRILLED	DEPTH WELL	WATER LEVEL	DATE MEAS.
(A-02-02)22cac	55-522163	M	1988	160		
(A-02-02)22cac	55-518077	M	1988	150		
(A-02-02)22cac	55-515979	M	1988	130		
(A-02-02)22cac	55-520313	M	1988	140		
(A-02-02)22cac	55-518071	M	1987	150		
(A-02-02)22cac	55-518070	M	1987	150		
(A-02-02)22cac	55-515553	M	1986	145		
(A-02-02)22cac	55-516109	M	1986	147		
(A-02-02)22cac	55-516110	M	1986	155		
(A-02-02)22cac	55-516111	M	1986	155		
(A-02-02)22cac	55-515554	M	1986	145		
(A-02-02)22cac	55-515555	M	1986	145		
(A-02-02)22cac	55-515556	M	1986	145		
(A-02-02)22cac	55-515557	M	1987	150		
(A-02-02)22cac	55-515558	M	1987	140		
(A-02-02)22cac	55-514743	M	1986	135		
(A-02-02)22cac	55-514746	M	1986	135		
(A-02-02)22cac	55-514747	M	1986	135		
(A-02-02)22cad	55-521984	M	1988	135		
(A-02-02)22cba	55-518072	M	1987	150		
(A-02-02)22cdb	55-514564	T	1986	130		
(A-02-02)22cdb	55-514744	M	1986	135		
(A-02-02)22cdb	55-514905	M	1986	142		
(A-02-02)22cdb	55-514745	M	1986	135		
(A-02-02)22cdb	55-514565	T	1986	130		
(A-02-02)22cdb	55-514559	T	1986	130		
(A-02-02)22cdb	55-514561	T	1987	130		
(A-02-02)22cdb	55-514562	T	1986	130		
(A-02-02)22cdb	55-514563	T	1986	130		
(A-02-02)22cdb	55-514429	M	1988	125		
(A-02-02)22cdb	55-514566	T	1986	130		
(A-02-02)22daa	55-626551	P	1954	405		
(A-02-02)22dcd	55-520570	M	1988	130		
(A-02-02)24aaa	55-607691	U	1919	470	72.5	1984
(A-02-02)24cbb	55-626555	U	1952	400		
(A-02-02)24dbb	55-522462	N	1989	260		
(A-02-02)25bbb	55-522840	M	1988	95		
(A-02-02)25bbb	55-522841	M	1988	500	150.8	1986
(A-02-02)25bca	55-617850	I	1950	500	150.8	1986
(A-02-02)25ccb	55-522459	N	1989	260		
(A-02-02)26bdc	55-608377	I	1949	698	129	1981
(A-02-02)26bdd	55-618512	P	1949	--	195.8	1986
(A-02-02)26cdb	55-800680	P	1974	950		
(A-02-02)27abc	55-522461	N	1989	260		
(A-02-02)27acb	55-608381	I	1948	700	140.4	1982

P = public supply, H = domestic, I = irrigation

M = momitoring, T = test, -- = unknown

C = cathodic, N = non use, U = unused

TABLE 4.

LOCATION OF REGISTERED WELLS WITHIN A THREE MILE RADIUS OF Hill Brothers Chemical

Source: ADWR Data Base

WELL LOCATION	ADWR WELL REGISTRATION	USE	DATE DRILLED	DEPTH WELL	WATER LEVEL	DATE MEAS.
(A-02-02)27adc	55-603866	P	1949	--	129	1981
(A-02-02)27dcb1	55-626552	P	1974	--	130.7	1982
(A-02-02)27dcb2	55-626553	P	1974	--	130.7	1982
(A-02-02)28abb1	55-626575	P	--	650	119.3	1984
(A-02-02)28abb2	55-626576	P	--	--	159.7	1982
(A-02-02)28bdd2	55-608374	I	1948	700	151	1982
(A-02-02)29acc	55-607675	I	1949	700	183.4	1986
(A-02-02)29bcb	55-608387	I	1949	700	170.1	1982
(A-02-02)29ddd	55-519666	M	1987	50		
(A-02-02)29ddd	55-519667	M	1987	50		
(A-02-02)30baa	55-626577	P	1958	710		
(A-02-02)30baa	55-626578	P	1958	545		
(A-02-02)30bab	55-626587	I	1946	1100	150.2	1986
(A-02-02)30dbb	55-626579	P	1948	504	151	1982
(A-02-02)31ada	55-607727	I	--	550	153.8	1986
(A-02-02)32abb	55-626580	P	1946	696	153.8	1986
(A-02-02)32daa	55-607736	I	1948	616	130.3	1982
(A-02-02)34	55-628053	H	--	175		
(A-02-02)34adc	55-626550	P	1946	434	113	1982
(A-02-02)35	55-522460	N	1989	260		
(A-02-02)35bcb	55-521049	M	1988	130		
(A-02-02)35bcb	55-521051	M	1988	130		
(A-02-02)35bcb	55-521878	M	1988	125		
(A-02-02)35bcb	55-522188	M	1988	130		
(A-02-02)35bcb	55-522189	M	1988	130		
(A-02-02)35bcb	55-520571	M	1988	80		
(A-02-02)35bcb	55-520572	M	1988	80		
(A-02-02)35bcb	55-520573	M	1988	130		
(A-02-02)35bcb	55-520574	M	1988	80		
(A-02-02)35cdd	55-626561	P	--	381		
(A-02-02)36cba	55-603550	N	1966	780		
(A-02-02)36dac	55-086544	P	1980	150		
(A-02-02)36dbd	55-522805	M	1988	110		
(A-02-02)36dcd1	55-617311	U	--	--		
(A-02-02)36dcd2	55-617312	N	1961	655		
(A-02-02)36dcc	55-520310	M	1988	110		
(A-02-03)18ccc	55-520865	M	1988	40		
(A-02-03)19bcd	55-626565	P	--	650	130.0	1987
(A-02-03)19dbb	55-617697	U	1924	204		
(A-02-03)19dca	55-639654	H	--	--		
(A-02-03)30abd	55-086539	P	1980	150		
(A-02-03)31bcd	55-626536	I	--	--		

P = public supply, H = domestic, I = irrigation

M = momitoring, T = test, -- = unknown

C = cathodic, N = non use, U = unused

through the area. The hydraulic conductivity of these heterogeneous sediments is estimated to range from 10^{-3} to 10^{-7} cm/sec. This wide range in permeability makes characterization of the potential for an observed release from Hill Brothers into the groundwater uncertain. (18)

The net precipitation for the months of November through April is -12.63 inches. A 24-hour rainfall is approximately 1.63 inches. (19) (20)

3.4 SURFACE WATER:

The Hill Brothers facility is located one-half mile north of the Grand Canal, a Salt River Project irrigation canal. The canal transports irrigation water across the valley and is not used as a source of drinking water. The canal is banked and elevated to prevent surface run-off from entering it. There is no surface water pathway present from the Hill Brothers facility to the canal or the Salt River. The Salt River is located approximately six miles south of Hill Brothers and flows southwesterly. The Salt River is normally dry with flows occurring in response to direct precipitation, discharge of waste water effluent, and/or releases of water by the dams located upstream. Flows occurring in the Salt River are not directly utilized but do provide a source of recharge to the groundwater basin. There is no target population for surface water pathway related to Hill Brothers This facility reports they have had no spills or discharges to the surface water. No surface water samples were taken at this facility. (21) (22)

The site's topography has been altered due to urbanization, but the area appears to slope to the southwest approximately 20 feet per mile. A retention basin is located along the northern property line. The basin is approximately 60 feet wide and runs along the entire northern boundary of the facility. It is not apparent what area this detention basin collects drainage from. (4)

The 24-hour rainfall is approximately 1.63 inches. (19)(20)

3.5 AIR

There have been no documented air releases as defined by the Hazard Ranking System (HRS) from this facility. (23)

The potential for a release into the air from this facility is present due to the nature of the operations conducted at this facility. Chemicals are mixed, transferred, and transported in liquid and gas phases. A release could easily occur due

to venting and procedures used in transferring the chemicals. It is possible that a release of acid, ammonia, or chlorine to the air has occurred in the past during the spills or leaks reported by Hill Brothers, but air samples were not collected. However, in 1985 the City of Phoenix Fire Department responded to six incidents at the Hill Brothers facility. These incidents were due to exposures of hazardous materials, leaking storage containers, and contamination of the city sewer system. At two of these incidents, evacuation of nearby business was required due to high concentrations of chlorine gas at the Hill Brothers facility. Gases from tanks containing liquid chlorine, sulfuric acid, muriatic acid (hydrochloric acid), nitric acid and ammonium hydroxide are hood vented to a water scrubber. The bulk solvent storage tanks are equipped with pressure release valves and a "conservative control valve" to prevent release to the air. However, these control devices and scrubbers have failed in the past and the potential for a release into the air is present at this facility. (10) (23)

In addition, the paint spray booth is permitted by Maricopa County and is equipped with features designed to reduce emissions. (23)

3.6 PROPOSED REVISED HRS FACTORS

The facility is located within the boundaries of the West Central Phoenix Area WQARF site, one of the State Superfund sites. One of the objectives of the WQARF program is to identify facilities responsible for contaminating the groundwater and to invite them to perform their own investigation and remediation. If the facility is no longer in existence, bankrupt, or uncooperative, the State will perform the investigation and cleanup and pursue cost recovery.

Within a three mile radius of the Hill Brothers facility, there are no Federal and State endangered species, critical habitats, wetlands, or wildlife areas. (24)

Other than minor soil staining, there are no visible effects on land, plants, or animals from on site chemical storage and disposal activities at the Hill Brothers facility. (4)

The Hill Brothers facility does not pose an actual or potential threat to sensitive environments or to contamination of the food chain.

The risk of direct on-site exposure to the general public is difficult to evaluate. The site is fenced and access is restricted. The potential for an air release is present at this facility based on historical

incidents of nazardous material leaks, fires, spills and discharges into the sewer. The potential risk appears to have been reduced due to containment features at the facility, compliance with city sewer discharge limits, and reduction of incidents involving hazardous material with the ADEQ and City of Phoenix Fire Department in the past two years. The potential does exist for accidental surface spills or leaks occurring on-site. (4) (10)

4.0 SUMMARY OF INVESTIGATIVE EFFORTS

The investigative efforts at this facility fall into three categories: site inspection visit, soil and soil gas sampling, and groundwater sampling.

The objectives of the sampling (soil, soil gas and groundwater) plan was to aid in determining if Hill Brothers has had an observed release of contaminants into the soil and/or groundwater.

The soil gas sampling was utilized to aid in determining if the contaminants detected in the groundwater could be attributed to the Hill Brothers facility. Additionally, the groundwater sampling results will provide data to better characterize the source and extent of 1,1-DCE contamination in the groundwater around the NWSC.

4.1 Site Inspection Visit

A site inspection of the Hill Brothers facility was conducted March 29, 1989 by the ADEQ. At the inspection, ADEQ was represented by Judith Heywood, Dan Williams, Sue Monroe, and ADEQ's contractor Earth Technology Corp. represented by Kathy Roxlo. The Hill Brothers representatives were B Douglas Hill, Executive Vice President; Don Catt, Vice President Arizona Operations; Everett J McLean, Corporate Compliance and Safety; and Bill Prior, Plant Operation.

An interview was conducted with the above personnel addressing the specific site inspection questions. After the interview, a facility tour was conducted. The tour consisted of a walk-through of the office, Mixing blending, and storage areas. The photographs taken and the facility map made during the tour are included in Appendixes F and G.

4.2 Soil and Soil Gas Sampling

4.2.1 Field Methods amd Procedures

The soil gas and soil sampling at the Hill Brothers facility was conducted on July 21, and 27, 1989. The testing program involved a Cone Penetration Test (CPT) to provide information on site stratigraphy, Soil Gas Samples collected (at depths based on the information developed from the CPT) and analyzed with the on-site Gas Chromatograph (GC), and the Soil Sampling. (25)

CPT, soil gas, and soil sampling access holes were grouted following withdrawal of the probe and rods from the ground. A tremie pipe was inserted into the test holes and a

bentonite slurry, consisting of approximately 7 % bentonite by weight, was pumped into the tremie pipe and the hole. An asphalt patch was placed on the surface. (26)

4.2.1a Cone Penetration Test (CPT)

The CPT was performed in order to assess the stratigraphy of the site, and in turn allowed identification of optimum soil and soil gas sampling depths. The CPT test was accomplished by advancing an instrumented probe into the ground while simultaneously monitoring the resistance to penetration. The CPT was done at Locations HB1 and HB4. At HB1 at a depth of 16 feet, the test was terminated due to a cone tip resistance of greater than 400 tons/ square foot. This also occurred at location HB4, at a depth of 19 feet. (25) (26)

Stratigraphic and parametric interpretations of CPT data were based on relationships between cone tip and friction sleeve resistance. The calculated friction ratio (CPT friction sleeve resistance divided by cone tip resistance) was used as an indicator of soil behavior type. Granular soils typically have low friction ratios and high cone tip resistance while cohesive soils have high friction ratios and low cone tip resistance. The data was collected as a function of depth at 0.1-foot depth intervals. Immediately following the CPT, the data collect was both printed and graphically plotted. This data provided the means to identify and optimize soil gas sampling and soil sampling depths. (25) (26)

The CPT utilized a self-contained rod and probe decontamination chamber. As the rods were withdrawn from the ground they passed through the chamber and were subjected to high pressure jets of hot water mixed with a "alconox" type cleaner prior to handling. The washing spray and waste water were contained within the chamber and then pumped to a 55 gallon DOT approved waste water barrel. The water was stored in the barrels on site for proper disposal at a later date. See Appendix B. (26)

4.2.1b Soil Gas

Soil gas sampling was also performed with the CPT equipment by replacing the cone penetrometer assembly with a sampling probe. Prior to obtaining a soil gas sample, a system blank and an ambient air sample were taken. After the system blank indicated no system contamination, the soil gas probe was inserted into the soil. The ambient air samples were obtained to monitor background readings. The probe was pushed into the soil to a sample depth selected on the basis of the CPT data. At this point, the flow of soil gas into the probe was induced by means of a peristaltic vacuum pump. The flow rate and pressure was monitored to assure an adequate flow rate under minimal pressure prior to sample collection. The probe and the sample line were purged with a minimum of three line volumes prior to sample collection. The soil gas sample was obtained with a glass syringe from a

sample port in the sample line prior to the in-line flow meter. The sample was collected by a representative of Tracer Research Inc. and analyzed on-site in a dual-column gas chromatograph. After the soil gas sample was collected, Organic Vapor Analyzer (OVA) and HNU readings were taken at the exhaust of the soil gas sampling polyethylene line to monitor for potential exposure to organic vapors. (25) (26)

After each sample location, the sampling probe was deployed and decontaminated in the same manner as the CPT probe with the self-contained decontamination chamber, describe previously. The ceramic cuff of the soil gas probe was replaced after each sample location. In addition the internal sampling system was decontaminated by purging the polyethylene sample line with ultra pure air or nitrogen gas. (25) (26)

At Locations HB1 and HB4, the soil gas probe was advanced into the soil in a sample location area adjacent to the CPT test area but not in the same test hole. (26)

4.2.1c Soil Sample Collection

In addition to the CPT and the soil gas sampling one soil sample was collected at this site. The sample plan describe the sampler that was to be used for soil sample collection as a Swedish Standard Piston Sampler. (25) (26)

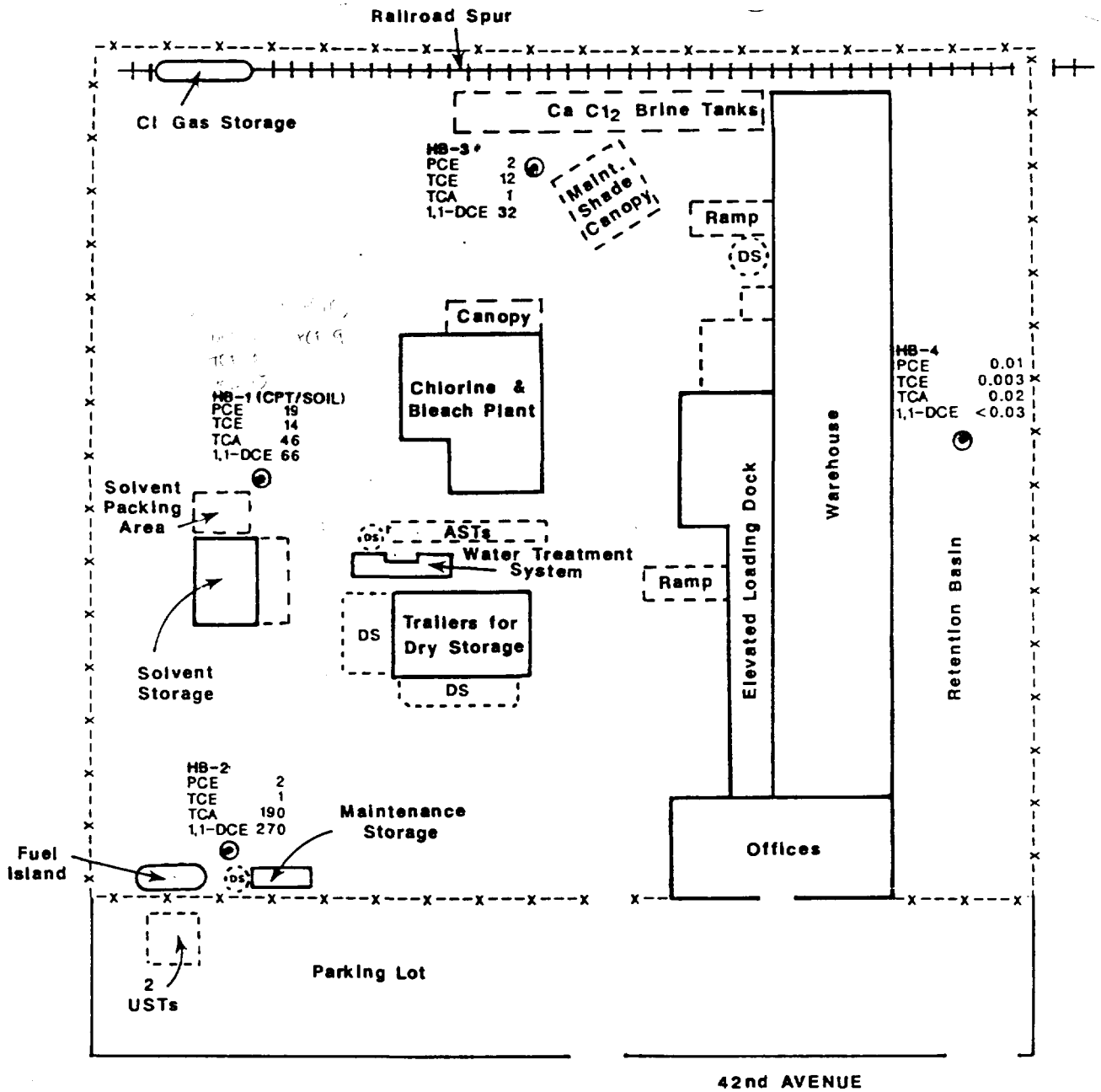
The soil sample was not collected from sample holes used to collect the soil gas samples or test holes used to obtain the CPT data. The sample was taken adjacent to these previous sample points. All of the test and sample points were located within an approximately 5 to 10 square foot area. (26)

The soil sample collected at Hill Brothers was collected at Location HB1 using the CPT equipment. The Swedish Standard Piston Sampler (SSPS) was attached to the end of the CPT push rods and deployed in generally the same manner as the basic CPT probe. The SSPS consists of a conical end plug or shoe, and outer sample housing and a series of inner sample tubes. The soil sample was collected in four steel tubes with each tube 2 inches in diameter and 6 3/4 inches in length. The sample was immediately capped with a teflon sheet followed by plastic end caps, placed on ice for shipment to the appropriate CLP laboratory for analysis. See Figure 8. (25) (26)

4.2.2 CPT and Soil Gas Samples

CPT was performed at locations HB1 and HB4 of Figure 8. Results of the CPT are included in Appendix B. Based on the information obtained from the CPT, and historical waste management practices, soil gas samples were obtained at four locations at various depths (See Figure 8 for sample locations).

Figure 8. Summary of Soil Gas and Soil Sampling



Explanation:

-x---x-	Fence
DS	Drum Storage
ASTs	Aboveground Storage Tank
◉	Soil Gas Sample Location
SOIL	Soil Sample Location
CPT	Cone Penetrometer Test Location

0 40 80 120

SCALE IN FEET

Concentrations of VOCs in soil gas are reported in ug/l.

The Earth Technology Corporation

SITE PLAN
HILL BROTHERS CHEMICAL COMPANY
4450 North 42nd Avenue
Phoenix, Arizona 85019

8–89

Table 5 summarizes the information collected in the field. Table 6 summarizes the soil gas sampling analytical results (See Appendix C for complete analytical results). (26)

Table 5 Soil Gas Sampling Locations and field parameters.

Location	Date	Time	Depth	HNU	OVA
HB1	7/21		4.99	7.0	19.0
HB2	7/27		13.62	40.0	ND
HB3	7/27		15.0	18.0	ND
HB4	7/27		18.0	4.8	8.5

A total of four sample locations were selected for soil gas analysis. At these locations one soil gas sample was collected. (26)

The following VOCs were detected in soil gas samples collected at the facility, at levels above the instrument detection limits: 1,1-DCE, TCA, TCE, PCE, and THC. The highest concentration of VOCs detected at the facility was the 1,1-DCE found in location HB2 at 270. ug/L. 1,1-DCE was also detected in two of the other locations at concentrations ranging from 33 to 66 ug/L. TCE was detected in all of the sample locations at concentrations ranging from 0.003 to 14 ug/L. TCA was detected in all four of the sampling locations at concentrations between 0.02 to 190 ug/L. PCE was also detected in all of the sample locations at concentrations of 0.01 to 19 ug/L. The total hydrocarbons (THC) were detected in three of the sample locations at concentrations between 9 and 140 ug/L. (27)

Table 6 Summary of Soil Gas Sampling Results.

Sample Location	1,1-DCE ug/L	trans-DCE ug/L	TCA ug/L	TCE ug/L	PCE ug/L	THC ug/L
HB1-05ft	66	<8	46	14	19	140
HB2-14ft	270	<20	190	1	2	130
HB3-15ft	32	<2	1	12	2	8
HB4-15ft	<0.03	<0.4	0.02	0.003	0.01	<0.03

4.2.3 Soil Samples

The soil sample was obtained at location HB1. Location HB1 was selected for soil sampling due to its proximity to a the solvent storage tanks and the wastewater treatment tanks. The soil sample was collected with the SSPS sampler. The soil sample collected at HB1 was submitted to CLP Lab for VOC and metal analyses. (26)

The analytical results of the soil sampling have not been received from the CLP Lab at the time this report was written. Upon receipt of the results, ADEQ will forward an interpretation of the results to be included in the final draft of this SI. This section will be forwarded to EPA under a separate cover.

Table 7 Soil Sample Locations

ADEQ SAMPLE #	CLP ORGANICS #	CLP METALS #
Hill 1	YF-382	MYD-853

4.3 Groundwater Sampling

Groundwater samples were collected from wells in the area around Hill Brothers on July 18, 1989. The samples were analyzed for VOC's and dissolved metals. The well locations, construction data, and ownership information on the wells sampled are listed in Table 8. The results of the analysis are listed in Tables 10 and 11. The location of wells sampled are shown in Figure 6, and Table 9.

Water samples were obtained from six of the wells in the area identified in the sample plan. In addition, a duplicate, a field blank, and a equipment blank samples were collected. A total of nine samples were submitted for analysis. The nine samples were submitted to EPA's Region IX Contract Lab for analysis using EPA Standard Method 524 for VOC's and EPA Standard Methods for metals. (25)

The seven wells selected for sampling were chosen on the basis of three general considerations : (1) the proximity to the Hill Brothers facility, (2) the proximity of NWSC wells with confirmed 1,1-DCE contamination, and (3) the local and regional groundwater flow direction. Using this rationale, the final well selection was dependent of well construction details, well use, and drillers log availability.

Table 8. Well Construction Data

WELL LOCATION	DNR Well Reg. No.	WELL OWNER ID	CLP VOA No.	CLP METALS No.	Comments	Depth of Well ft.	Perforations feet bls	Casing PVC inches
(A-02-02)22cdb1	55-514744	NWSC-10	4792Y-01	MYD-876		135	95-135	4.0
(A-02-02)22cdb1	---------	NWSC-10	4792Y-02	MYD-877	duplicate	---	-------	---
(A-02-02)cad	55-521984	NWSC-25	4792Y-03	MYD-878		136	106-136	4.0
Equipment Blank	---------	-------	4792Y-04	MYD-879		---	-------	---
(A-02-02)22cac1	55-518070	NWSC-21	4792Y-05	MYD-880		150	120-150	4.0
(A-02-02)22cac2	55-518071	NWSC-22	4792Y-06	MYD-881		150	120-150	4.0
(A-02-02)22cac4	55-515556	NWSC-17	4792Y-07	MYD-882	Lab QA/QC	145	105-145	4.0
Travel Blank	---------	-------	4792Y-08	MYD-883		---	-------	---
(A-02-02)22cac3	55-515558	NWSC-19	4792Y-09	MYD-884		140	100-140	4.0

The wells sampled are :

(A-02-02)22daa City of Phoenix Well # 69
This well is located 0.5 mile east of the Hill Brothers facility. This is a public supply well owned and operated by the City of Phoenix. This was selected due to its upgradient location from the Hill Brothers facility and the other wells selected for sampling. This well was drilled to a depth of 405 feet and equipped with an electric line shaft turbine pump. The depth to water was measured at 141.7 feet below land surface (bls) on 03/06/87. (16)

This well was inoperable at the time the sampling was scheduled. An alternate background or upgradient well was not substituted since the only other well upgradient is located 1 1/2 miles from the facility and would not provide true background data.

Previous sampling results from COP # 69 will be used to provide background data for this area.

(A-02-02)22cdb1 NWSC Monitor Well # 10
This well is located 0.4 mile south southeast of the Hill Brothers facility. This is a environmental monitor well installed by the City of Phoenix to evaluate the impact of a release (from the NWSC) of unleaded gasoline on the groundwater. Groundwater samples obtained from this well have never been analyzed for the full VOC scan. In the past the samples were analyzed for BTEX and TPHC only. This well was drilled to a depth of 135 feet and screened from 95-135 feet below land surface (bls). This well is located east of the NWSC wells with detectable levels of 1,1-DCE present in the groundwater. (7) (26) (28)

(A-02-02)22cad NWSC Monitor Well # 25
This well is located 0.3 mile south southeast of the Hill Brothers facility. This well is drilled to a depth of 136 feet and screened from 106-166 feet below land surface. This well is also a monitor well installed by the City of Phoenix at the NWSC and has never been analyzed for the complete VOC scan. This well is located east of the NWSC wells with detectable levels of 1,1-DCE present in the groundwater. (7) (28)

(A-02-02)22cac1, NWSC # 21 and (A-02-02)cac2 NWSC # 22
These wells are located 0.3 mile south southeast of the Hill Brothers facility. These wells are monitor wells installed by the City of Phoenix at the NWSC. These wells are both drilled to a depth of 150 feet and screened from 120 to 150 feet below land surface. Samples from these wells have not been analyzed for the full VOC scan in the past. These wells are located east of the wells at the NWSC with detectable

levels of 1,1-DCE present in the groundwater. The depth to water was measured in NWSC # 21 at 115.2 feet bls and in NWSC # 22 at 119.6 feet bls, on 07/18/89. (7) (26) (28)

(A-02-02)22cac4 NWSC Monitor Well # 17 detected 1,1-DCE
This well is located approximately 0.25 mile south of the Hill Brothers facility. This well is drilled to a depth of 145 feet, screened from 105 to 145 feet below land surface. This well is located east of NWSC well # 24 and north of NWSC well # 3, both of which have detectable levels of 1,1-DCE in the groundwater. (7) (28)

(A-02-02)22cac3 NWSC Well # 19
This well is located 0.25 miles southeast of the Hill Brothers facility. This well was drilled to a depth of 140 feet and screened from 100 to 140 feet below land surface. This well was installed by the City of Phoenix at the NWSC and will be used in the remediation proposed at the site. Samples from this well have not been analyzed for the full VOC scan in the past. This well is located north and east of the wells at the NWSC with detectable levels of 1,1-DCE present in the groundwater. The depth to water was measured at 121.1 feet bls on 07/18/89. (7) (26) (28)

The COP well # 69 located 0.4 mile east and upgradient of the Hill Brothers facility. This well has been sampled yearly since 1984 for VOCs. No VOCs have been detected in groundwater samples collected from this well. (7)

Table 9. Groundwater Sampling Locations

WELL LOCATION	WELL OWNER ID	CLP VOC #	CLP METALS #	Comments
(A-02-02)22cdb1	NWSC #10	4792Y-01	MYD-876	TCE
(A-02-02)22cdb1	NWSC #10	4792Y-02	MYD-877	duplicate
(A-02-02)cad	NWSC #25	4792Y-03	MYD-878	TCE, PCE
Equipment Blank	-------	4792Y-04	MYD-879	
(A-02-02)22cac1	NWSC #21	4792Y-05	MYD-880	
(A-02-02)22cac2	NWSC #22	4792Y-06	MYD-881	
(A-02-02)22cac4	NWSC #17	4792Y-07	MYD-882	Lab QA/QC 1,1-DCE
Travel Blank	-------	4792Y-08	MYD-883	
(A-02-02)22cac3	NWSC #19	4792Y-09	MYD-884	

The laboratory results for the groundwater samples are given in Tables 10 and 11.

5.0 EMERGENCY REMOVAL CONSIDERATION

Does not apply to this site. There is no evidence to indicate a potential direct contact threat on-site. The site is fenced.

There are no immediate removal considerations at this site.

6.0 CONCLUSIONS and RECOMMENDATIONS

CONCLUSIONS

The Hill Brothers Chemical Company is located at 4450 N. 42nd
Avenue, in the City of Phoenix, Arizona. This company operates a chemical distribution facility in which tanker trucks and railroad cars deliver chemicals to the facility in bulk form. The chemicals are pumped or transferred into tanks on the site for storage and transferred into containers for distribution. The chemicals handled at Hill Brothers include: acids, bases, solvents, and concrete additives. Hill Brothers has been in operation at this location for 20 years, since 1969. Hill Brothers reports they do not generate any hazardous waste from their operation. Waste water is pre-treated to neutralize pH prior to discharge to the sewer. Any potential for an observed release at this facility would involve the spill, leak, or discharge of hazardous materials stored or formulated at this site.

Elevated levels of VOCs (PCE, 1,1-DCE, TCE, AND TCA) were detected in soil gas samples obtained from five locations on the facility. The VOCs were detected in the soil gas samples collected at 5 to 15 feet below the facility. Hill Brothers is located less than 0.25 mile from COP NWSC MW-24 where 1,1-DCE was detected in the groundwater. The 1,1-DCE was also detected in the soil gas samples collected at the facility. Under laboratory conditions, both TCE and TCA have been shown to degrade to 1,1-DCE. In addition, PCE has also been shown to degrade to TCE and subsequently to 1,1-DCE. (4) (26) (27)

While the Hill Brothers facility is not located regional upgradient from the NWSC, the site's hydraulic and groundwater flow direction have not been determined. With out this data, along with the results of the July 18, 1989 groundwater sampling at the NWSC, a conclusion regarding if an observed release has occurred at this facility, cannot be made. It is not clear if the VOC contamination of the unsaturated zone has reached the groundwater or if it is related to the 1,1-DCE contamination observed in the NWSC

monitor wells. However, it appears that even without a confirmed observed release, this site is likely to achieve a high enough HRS score to qualify for the NPL. The following factors are the basis for this conclusion:

1. Soil gas samples collected at the Hill Brothers facility indicate significant VOC contamination of the unsaturated zone beneath the facility. Depth to groundwater at this site is approximately 115 feet. The potential for the VOCs in the unsaturated zone to reach the groundwater (if they have not already done so) is high.

2. High toxicity/persistence values for 1,1-DCE (15), PCE (12), and heavy metals from drum rinsing (18).

3. The quantity of hazardous (solvent) waste stored and transported at Hill Brothers in conjunction with the historical record of incidents involving spills, leaks, and sewer discharge violations of hazardous materials at this facility;

4. The target population (927,965) and groundwater use (public supply) within a three mile radius of Hill Brothers.

RECOMMENDATIONS:

6.1 EPA

Based on the documentation supplied in this report it appears the Hill Brothers facility could achieve a HRS score high enough for inclusion on the NPL.

EPA will not conduct a listing site inspection (LSI) for this site without first consulting with the State to determine the status of the facility.

EPA will consider the remediation activities being conducted by responsible parties or interested parties at the site and/or State compliance activities at the site to determine the need for future CERCLA activities.

It is recommended that Preliminary Assessments be conducted at the following facilities located near the Hill Brothers facility:

-Rinchem Co., 4115 W. Turney Ave., AZD982007338
-Hogon Manufacturing, 4223 W. Highland Ave., AZD981984362

6.2 State

This facility has been referred for further investigation and remedial action under the State Authority to one or more of the State enforcement programs (i.e. RCRA, UST, WQARF, or Water Pollution Compliance).

Additional technical work at Hill Brothers should include, but is not limited to:

1. Define the lateral and vertical extent of VOC contamination of the vadose zone through the use of a soil gas survey over the entire site. This type of sampling could also locate VOC disposal areas, which could aid in determining the location for soil sampling and monitor well installation.

2. Determine if contamination other than VOC exists at this facility.

3. Schedule quarterly sampling of downgradient NWSC monitor wells (located along the eastern boundary of the NWSC) for VOC contamination.

4. Drilling and installation of monitor well(s) in and around the Hill Brothers facility for the purpose of:

   a. establishing the site hydrogeology, including hydraulic gradient and direction of groundwater flow and lithologic characteristics of the aquifer;

   b. obtaining groundwater samples from the upper zone of the aquifer to aid in determining the lateral and vertical extent of VOC contamination

ADEQ MANAGEMENT REVIEW/CONCURRENCE

N. L. Williams 9/18/89

EPA RECOMMENDATION FOR FURTHER ACTION:

	Initial	Date
No Further Action Under CERCLA		
Listing Site Inspection	~~CLS~~	~~9/19/89~~

Notes:

EPA Recommendation: LSI (low priority) under CERCLIS, based on HRS score.

Linda Parker 9/19/89

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1. Preliminary Assessment Hill Brothers Chemical Company, prepared by Judy Heywood, ADEQ, March 24, 1989.

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6. Phoenix Well # 71 Site Inspection Report, by Charles Graf, Arizona Department of Health Services, Sept. 3, 1985.

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8. Groundwater Technology, Inc., Preliminary Report on Phase I Results of the Surface Investigation to Assess the Impact of an Unleaded Gasoline Loss at the Northwest Service Center, August 1986., February, 1987 and December, 1988. Prepared for the City of Phoenix.

9. Arizona Department of Environmental Quality, 1989. Unpublished RCRA listing and inspection files, RCRA Compliance Unit, Department of Environmental Quality, Phoenix, Arizona.

10. City of Phoenix Wastewater Dept. files on the Hill Brothers Chemical Co., unpublished letters.

11. EPA Hazard Ranking System Waste Values (Toxicity/Persistence Matrix)

12. Notification for Underground Storage Tanks, EPA Form 7530-1 Completed for Hill Brothers Chemical by Don Catt, January 4,1986.

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15. Groundwater Technology, Inc., Application for Poor Quality Groundwater Withdrawal Permit for the Northwest Service Center at 4019 West Glenrosa, Phoenix, Arizona., October, 1986.

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19. Rainfall Frequency Atlas of the United States, Technical Paper No. 40, U.S. Government Printing Office, Washington, D.C., 1983.

20. Climatic Atlas of the United States, U.S. Department of Commerce, Environmental Science Services Administration, Environmental Data Service, June, 1968.

21. United States Geological Survey, Fowler, Arizona, 7½ minute Topographic Map, 1952. Photo revised 1967 and 1973.

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23. Heywood, Judy, Arizona Department of Environmental Quality and Larry Crisafulli, Maricopa County Air Quality, telephone conversation, March 24, 1989.

24. Bruce Palmer, Non-game Habitat Specialist, Arizona Game and Fish Department, to Melanie Anderson, E&E FIT., letter, April 4, 1988.

25. West Central Phoenix Area Groundwater, Soil, and Soil gas Sampling Plan., J. Heywood, A. Vargas, and D. Williams, ADEQ., May 19, 1989.

26. Heywood, J., field notes of Groundwater, Soil, and Soil Gas Sampling, July 17 through August 4 1989.

27. Tracer Research Corp., soil gas sampling results, July 17 through August 4 1989.

28. Groundwater Technology Inc., Northwest Service Center Well Specifications, undated.

APPENDIX A

CONTACT LOG AND REPORTS

PA/SI CONTACT LOG

Facility Name: Hill Bros. Chemical Company
Facility ID #: AZD008397242

NAME	AFFILIATION	PHONE #	DATE	INFORMATION
Drive-by	--------	------	03/20/89	DAT Site map and access data
Barbara Herron	ADEQ-UST	(602) 257-2203	03/23/89	DAH Search UST Files - NO DATA
Coles City Dir.	--------	------	03/24/89	DAH Site History
Larry Crisafilli	Maricopa County	(602)258-6381	03/24/89	DAH Data Re: Air Permit A8601089

CONTACT REPORT

CONTACT BY J. Heywood DATE 3/20/89 TIME _____

DISTRIBUTE TO H.11 Bros Chemical PA File

AZD 008397242 State ID # - 329

BETWEEN Drive-by TELEPHONE (___) _____

OF _____

AND _____ EHS

REGARDING H.11 Bros Chemical

DISCUSSION Drive by and walk around H.11 Bros. Facility.
Located at 4450 N. 42nd Ave.
1- Bordered on north by Hogon Manuf. - out of operation
(appears was a large Facility
2- Bordered on East by 42nd Ave
3 - Bordered on South by SRL Co. (Frozen food transport)
4 - Bordered on west by R.R. tracks.
5 - Site is fenced, access is restricted to office and
parking
6 - POP. NW SC is approx 0.25 mile south east of
H.11 Bros.
7 - Site and Facility map drawn
8 - No photos taken.

ACTION ITEMS _____

VI:CRPT

CONTACT REPORT

CONTACT BY J. Heywood DATE 3/24/89 TIME 2^00 pm

DISTRIBUTE TO H.11 Bros. Chemical PA file

AZD008397242 State ID # 329

BETWEEN Larry CRisafulli TELEPHONE (602) 258-6381

OF Maricopa County Air Quality

AND J. Heywood EHS

REGARDING H.11 Bros Air Permit # A8601089

DISCUSSION This facility is inspected on an annual basis. The last inspection was 12/21/88. H.11 Bros has installed pollution control devices on site, they include hooded vent from liquid chlorine, H_2SO_4, Muriatic acid, anhydrous ammonia, to a water scrubber.

H.11 Bros has 2 above ground bulk storage tanks for 1,1,1-TCA equipped with control values and pressure Release values.

H.11 Bros has a permit for a paint booth.

The File indicates no record of any incidents, violations or complaints re: H.11 Bros.

ACTION ITEMS

VI:CRFT

CONTACT REPORT

CONTACT BY J. Heywood DATE 3/24/89 TIME 1130

DISTRIBUTE TO Georgia-Pacific PA File

AZD 080664081

4239 & 4245 N. 39th Ave

BETWEEN Coles City of Phoenix Directory TELEPHONE (___) ___

OF Phoenix Public Library - Main Branch

AND Reference Section EHS

REGARDING Georgia-Pacific - Stewart/Walker - Land use history

DISCUSSION Checked dates 1966 through 1988

1966 - not Listed

1967-1968 - not listed

1969 - Plastic Containers Corp. Bottle Manufacturing

1970 - 1976 - Plastic Container Corp.

1977 - 1987 Georgia-Pacific

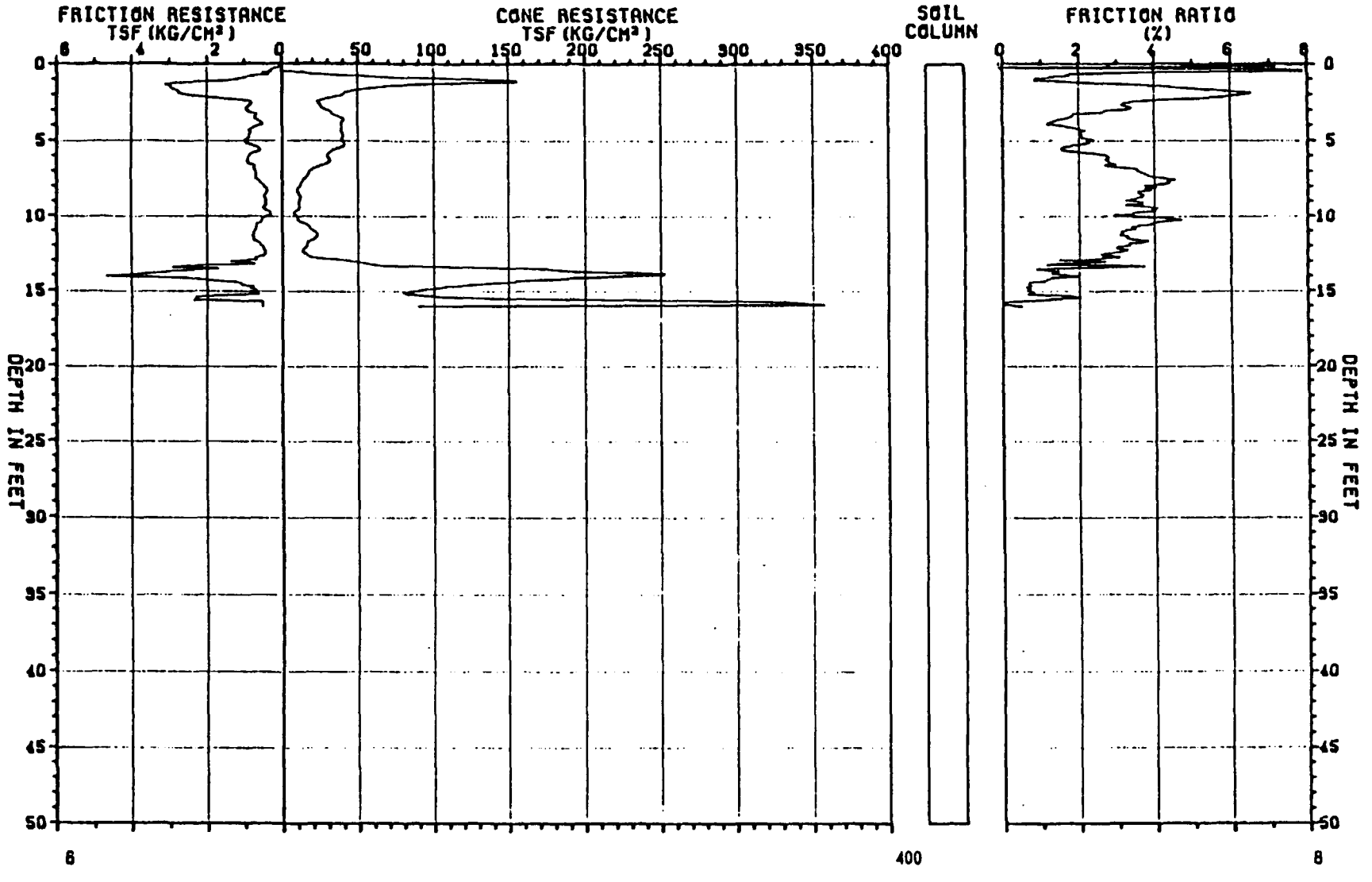
1987 - 1988 Georgia-Pacific + Stewart/Walker.

ACTION ITEMS

VI:CRPT

APPENDIX B

CONE PENETRATION TEST DATA



PROJECT: ARIZONA SOIL GAS
PROJECT NUMBER: 89-232-0501
INSTRUMENT NUMBER: F15CKE085
DATE: 07-21-1989

The Earth Technology Corporation

CONE PENETROMETER TEST

PROBE: HB1

CONE PENETROMETER TEST DATA

SOUNDING : HB1
PROJECT : ARIZONA SOIL GAS
PROJECT No: 89-232-0501
TEST DATE : 07-21-1989

LOCATION : PHOENIX AZ.
INSTRUMENT : F15CKE085
ELECTRONICS: T-2
OPERATOR : MR/EC/DH/NB

Assumed Depth to Water (Feet)= 100 Soil Total Unit Weight (pcf) = 115

DEPTH (ft)	NORMALIZED CONE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	EQUIV RELATIVE DENSITY	EQUIV FRICTION ANGLE	EQUIV N1	EQUIV N1'	Su1= (C-T)/Nc (ksf)	Su2= Fs*A (ksf)
1.0	263.2	0.98	SAND TO SILTY SAND	70-80	42-45	>100	>100		
2.0	79.0	6.46	*SANDY CLAY-SILTY CLAY			>100	>100	2.71	2.71
3.0	49.9	3.39	SANDY SILT-CLAYEY SILT	80-90	27-31	25-40	40-60		
4.0	65.1	1.28	SILTY SAND-SANDY SILT	40-50	35-40	20-25	25-40		
5.0	60.4	2.49	SILTY SAND-SANDY SILT	60-70	31-35	25-40	40-60		
6.0	43.8	2.78	SANDY SILT-CLAYEY SILT	60-70	27-31	20-25	25-40		
7.0	27.6	3.65	CLAYEY SILT-SILTY CLAY	70-80		15-20	25-40	2.59	1.44
8.0	16.6	3.84	CLAYEY SILT-SILTY CLAY			5-10	15-20	1.59	0.95
9.0	15.3	3.36	CLAYEY SILT-SILTY CLAY			5-10	15-20	1.52	0.80
10.0	11.8	3.04	SILTY CLAY TO CLAY			1-5	10-15	1.19	0.58
11.0	24.6	3.36	SANDY SILT-CLAYEY SILT	60-70		10-15	20-25		
12.0	19.5	3.45	CLAYEY SILT-SILTY CLAY			10-15	20-25	2.14	1.16
13.0	47.8	1.58	SILTY SAND-SANDY SILT	40-50	31-35	15-20	20-25		
14.0	277.5	1.63	SAND TO SILTY SAND	80-90	40-42	>100	>100		
15.0	99.3	0.74	SAND TO SILTY SAND	40-50	40-42	25-40	25-40		

* - INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL

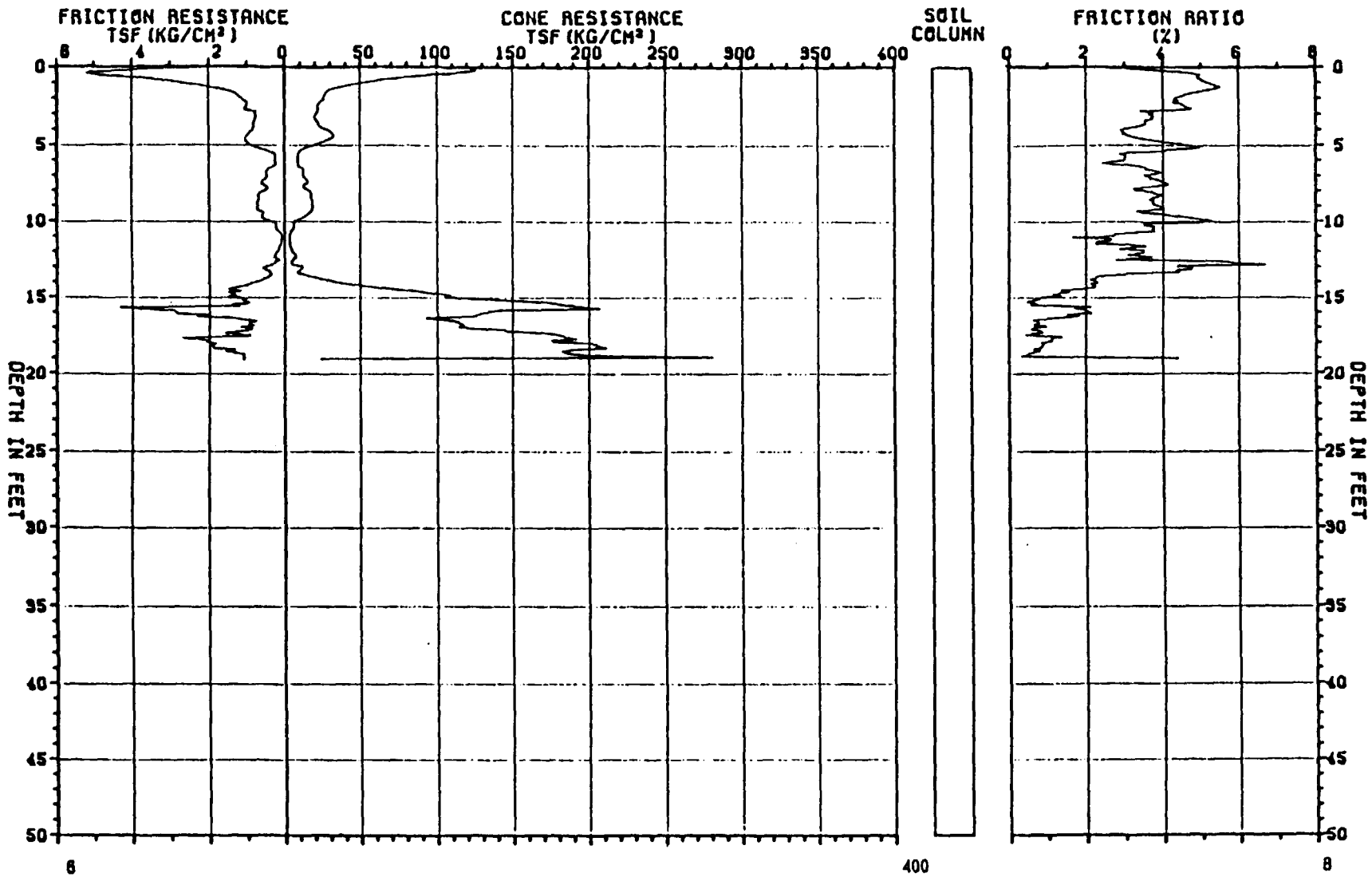
CONE PENETROMETER TEST DATA

SOUNDING : HB1
PROJECT : ARIZONA SOIL GAS
PROJECT No: 89-232-0501
TEST DATE : 07-21-1989

LOCATION : PHOENIX AZ.
INSTRUMENT : F15CKE085
ELECTRONICS: T-2
OPERATOR : MR/EC/DH/NB

SHEET 1 OF SOUNDING HB1

DEPTH (ft)	CONE (tsf)	FRICTION (tsf)	RATIO (%)	PORE (tsf)	CONDUCTIVITY (uMHOS/cm)	EXCIT (vdc)
0.00	0.0	0.00	14.79	NA	NA	9.99
1.00	117.5	1.15	0.98	NA	NA	9.99
2.00	40.8	2.63	6.46	NA	NA	9.99
3.00	28.3	0.96	3.39	NA	NA	9.99
4.00	39.7	0.51	1.28	NA	NA	9.99
5.00	39.2	0.98	2.49	NA	NA	9.99
6.00	30.0	0.83	2.78	NA	NA	9.99
7.00	19.8	0.72	3.65	NA	NA	9.99
8.00	12.4	0.48	3.84	NA	NA	9.99
9.00	11.9	0.40	3.36	NA	NA	9.99
10.00	9.5	0.29	3.04	NA	NA	9.99
11.00	20.5	0.69	3.36	NA	NA	9.99
12.00	16.8	0.58	3.45	NA	NA	9.99
13.00	42.4	0.67	1.58	NA	NA	9.99
14.00	253.6	4.13	1.63	NA	NA	9.99
15.00	93.3	0.69	0.74	NA	NA	9.99
16.00	359.1	0.51	0.14	NA	NA	9.99



PROJECT: ARIZONA SOIL GAS
PROJECT NUMBER: 89-232-0501
INSTRUMENT NUMBER: F15CKE085
DATE: 07-25-1989

The Earth Technology Corporation

CONE PENETROMETER TEST

PROBE: HB-4

CONE PENETROMETER TEST DATA

SOUNDING : HB-4
PROJECT : ARIZONA SOIL GAS
PROJECT No: 89-232-0501
TEST DATE : 07-25-1989

LOCATION : PHOENIX
INSTRUMENT : F15CKE085
ELECTRONICS: T-2
OPERATOR : MS/EC/MR

Assumed Depth to Water (Feet)= 100 Soil Total Unit Weight (pcf) = 115

DEPTH (ft)	NORMALIZED CONE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	EQUIV RELATIVE DENSITY	EQUIV FRICTION ANGLE	EQUIV N1	EQUIV N1'	Su1= (C-T)/Nc (ksf)	Su2= Fs‡A (ksf)
1.0	134.9	5.12	‡SANDY CLAY-SILTY CLAY			>100	>100	4.01	4.01
2.0	50.9	4.60	‡SANDY CLAY-SILTY CLAY			40-60	40-60	1.74	1.74
3.0	38.3	3.50	SANDY SILT-CLAYEY SILT	70-80	27-31	20-25	25-40		
4.0	39.4	3.41	SANDY SILT-CLAYEY SILT	70-80	27-31	25-40	25-40		
5.0	36.5	4.16	CLAYEY SILT-SILTY CLAY			25-40	25-40	3.12	1.97
6.0	12.5	3.09	CLAYEY SILT-SILTY CLAY			5-10	15-20	1.09	0.53
7.0	17.1	4.03	CLAYEY SILT-SILTY CLAY			10-15	20-25	1.58	0.99
8.0	17.1	3.55	CLAYEY SILT-SILTY CLAY			5-10	15-20	1.64	0.91
9.0	24.2	3.82	CLAYEY SILT-SILTY CLAY			10-15	20-25	2.44	1.44
10.0	14.8	4.81	CLAYEY SILT-SILTY CLAY			10-15	20-25	1.52	1.15
11.0	4.5	3.39	SILTY CLAY TO CLAY			1-5	5-10	0.41	0.25
12.0	5.5	3.26	SILTY CLAY TO CLAY			1-5	5-10	0.53	0.31
13.0	5.3	5.94	SILTY CLAY TO CLAY			1-5	10-15	0.53	0.53
14.0	25.8	2.31	SANDY SILT-CLAYEY SILT	40-50	27-31	5-10	15-20		
15.0	104.4	1.38	SAND TO SILTY SAND	50-60	35-40	40-60	40-60		
16.0	215.4	1.77	SAND TO SILTY SAND	80-90	40-42	>100	>100		
17.0	117.4	0.83	SAND TO SILTY SAND	50-60	40-42	25-40	25-40		
18.0	189.5	1.19	SAND TO SILTY SAND	60-70	40-42	80-100	80-100		

‡ - INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL

CONE PENETROMETER TEST DATA

SOUNDING : HB-4
PROJECT : ARIZONA SOIL GAS
PROJECT No: 89-232-0501
TEST DATE : 07-25-1989

LOCATION : PHOENIX
INSTRUMENT : F15CKE085
ELECTRONICS: T-2
OPERATOR : MS/EC/MR

SHEET 1 OF SOUNDING HB-4

DEPTH (ft)	CONE (tsf)	FRICTION (tsf)	RATIO (%)	PORE (tsf)	CONDUCTIVITY (uMHOS/cm)	EXCIT (vdc)
0.00	-0.0	0.00	0.00	NA	NA	9.99
1.00	60.2	3.08	5.12	NA	NA	9.99
2.00	26.3	1.21	4.60	NA	NA	9.99
3.00	21.7	0.76	3.50	NA	NA	9.99
4.00	24.1	0.82	3.41	NA	NA	9.99
5.00	23.7	0.98	4.16	NA	NA	9.99
6.00	8.5	0.26	3.09	NA	NA	9.99
7.00	12.3	0.49	4.03	NA	NA	9.99
8.00	12.8	0.45	3.55	NA	NA	9.99
9.00	18.8	0.72	3.82	NA	NA	9.99
10.00	12.0	0.57	4.81	NA	NA	9.99
11.00	3.7	0.13	3.39	NA	NA	9.99
12.00	4.7	0.15	3.26	NA	NA	9.99
13.00	4.7	0.28	5.94	NA	NA	9.99
14.00	23.6	0.55	2.31	NA	NA	9.99
15.00	98.1	1.35	1.38	NA	NA	9.99
16.00	207.8	3.69	1.77	NA	NA	9.99
17.00	116.3	0.97	0.83	NA	NA	9.99
18.00	192.3	2.28	1.19	NA	NA	9.99
19.00	189.2	1.09	0.57	NA	NA	9.99

APPENDIX C

SOIL GAS SAMPLE RESULTS

EARTH TECHNOLOGY\MAY INDUSTRIES\PHOENIX, ARIZONA JOB#G-104-89-SG
7-21-89
CONDENSED DATA

SAMPLE	CH2CL2 ug/l	DCE ug/l	Trans DCE ug/l	CHCL3 ug/l	TCA ug/l	TCE ug/l	PCE ug/l
AIR	<0.1	<0.03	<0.4	<0.0009	<0.0005	<0.002	<0.0008
Syst.Blk.	<0.1	<0.03	<0.4	<0.0009	<0.0005	<0.003	<0.0008
MA1-21.01	<2	40	<8	<0.02	4	41	0.4
MA1-51.01	<2	200	<8	<0.02	14	98	0.2
MA1-65.01	<2	180	<8	<0.02	13	130	0.4
Syst.Blk.	<0.1	<0.03	<0.4	<0.0009	<0.0005	<0.003	<0.0008
HB1-5	<2	66	<8	0.9	46	14	19
AIR	<0.1	<0.03	<0.4	<0.0009	0.03	<0.002	<0.0008

Analyzed by: J. Tangeman
Checked by: J. Tangeman
Proofed by: L. Lapsander

Tracer Research Corporation

EARTH TECHNOLOGY\MAY INDUSTRIES\PHOENIX, ARIZONA JOB#G-104-89-SG
7-21-89
CONDENSED DATA

SAMPLE	BENZENE Benzene ug/l	TOLUENE Toluene ug/l	Ethyl Benzene ug/l	XYLENE Xylene ug/l	Total Hydroc. ug/l	MEK ug/l	VINYL CHLORIDE ug/l
AIR	<0.03	<0.02	<0.03	<0.03	<0.03	N/A	<0.09
Syst.Blk.	<0.03	<0.02	<0.03	<0.03	<0.03	N/A	<0.09
MA1-21.01	<0.03	<0.02	<0.03	<0.03	60	N/A	<0.09
MA1-51.01	<0.03	<0.02	<0.03	<0.03	69	N/A	<0.09
MA1-65.01	<0.03	<0.02	<0.03	<0.03	140	N/A	<0.09
Syst.Blk.	<0.03	<0.02	<0.03	<0.03	<0.03	<0.08	<0.09
HB1-5	<0.03	<0.02	<0.03	<0.03	140	<0.08	<0.09
AIR SAMPLE	<0.03	<0.02	<0.03	<0.03	0.3	<0.08	<0.09

N/A not analyzed

Analyzed by: J. Tangeman
Checked by: J. Tangeman
Proofed by: L. Laplander

EARTH TECHNOLOGY\PRECISE METAL PRODUCTS\HILL BROTHERS CHEMICAL\F & B MFG.\PHOENIX, AZ JOB#G-104-89-SG
7-27-89
CONDENSED DATA

SAMPLE	CH2CL2 ug/l	1,1-DCE ug/l	Trans 1,2-DCE ug/l	TCA ug/l	TCE ug/l	PCE ug/l	BENZENE ug/l
Syst.Blk.	<0.1	<0.03	<0.4	0.006	<0.002	<0.0005	<0.03
AIR	<0.1	<0.03	<0.4	0.004	<0.002	<0.0005	<0.03
PRE2-15	<3	46	<8	32	68	0.9	<0.03
AIR	<0.1	<0.03	<0.4	0.001	0.002	<0.0005	<0.03
Syst.Blk.	<0.1	<0.03	<0.4	<0.0006	<0.002	<0.0005	<0.03
HB4-15	<0.1	<0.03	<0.4	0.02	0.003	0.01	<0.03
HB2-13.62	<6	270	<20	190	1	2	<0.03
Syst.Blk.	<0.1	<0.03	<0.4	0.03	<0.002	0.03	<0.03
HB3-15	<0.6	32	<2	1	12	2	<0.03
AIR	<0.1	<0.03	<0.4	0.008	<0.002	0.001	<0.03
FNB3-18	<130	<30	<400	24	3	1500	<0.03

Analyzed by: J. Tangeman
Checked by: J. Tangeman
Proofed by: L. Applander

EARTH TECHNOLOGY\PRECISE METAL PROD.\HILL BROTHERS CHEMICAL\F & B MFG.\PHOENIX, AZ JOB#G-104-89-SG
7-27-89
CONDENSED DATA

SAMPLE	Toluene ug/l	Ethyl Benzene ug/l	Xylenes ug/l	Total Hydroc. ug/l	Vinyl Chloride ug/l	MEK ug/l	CHCL3 ug/l
Syst.Blk.	<0.03	<0.03	<0.04	<0.03	<0.09	N/A	N/A
AIR	<0.03	<0.03	<0.04	<0.03	<0.09	N/A	N/A
PRE2-15	<0.03	<0.03	<0.04	34	<0.09	N/A	N/A
AIR	<0.03	<0.03	<0.04	<0.03	<0.09	<0.07	N/A
Syst.Blk.	<0.03	<0.03	<0.04	<0.03	<0.09	<0.07	N/A
HB4-15	<0.03	<0.03	<0.04	<0.03	<0.09	<0.07	N/A
HB2-13.62	<0.03	<0.03	<0.04	130	<0.09	<0.07	N/A
Syst.Blk.	<0.03	<0.03	<0.04	<0.03	<0.09	<0.07	N/A
HB3-15	<0.03	<0.03	<0.04	8	<0.09	<0.07	6
AIR	<0.03	<0.03	<0.04	<0.03	<0.09	<0.07	N/A
FNB3-18	<0.03	<0.03	<0.04	300	<0.09	<0.07	N/A

Analyzed by: J. Tangeman
Checked by: J. Tangeman
Proofed by: L. Lofland

APPENDIX D

GROUNDWATER SAMPLE RESULTS

APPENDIX E

DRILLERS LOGS

STATE OF ARIZONA
DEPARTMENT OF WATER RESOURCES
99 EAST VIRGINIA AVENUE
PHOENIX, ARIZONA 85004

WELL DRILLER REPORT

This report should be prepared by the driller in all detail and filed with the Department within 30 days following completion of the well.

1. Owner City of Phoenix
   Name
   2441 S. 22 Ave Phx AZ 85009
   Mailing Address
2. Driller Manuel Hernandez / Western Technologies
   Name
   3737 E. Broadway Rd Phx AZ 85036
   Mailing Address
3. Location of well: City Phx N.W. Service Ctr.
4. Permit No. (if issued) _____

DESCRIPTION OF WELL

5. Total depth of hole 140' ft.
6. Type of casing P.V.C.
7. Diameter and length of casing 4 in. from 0 to 140', _____ in from _____ to _____.
8. Method of sealing at reduction points NO Reduction Points
9. Perforated from — to _____, from _____ to _____, from _____ to _____.
10. Size of cuts .020 Number of cuts per foot 4 Rows
11. If screen was installed: Length 40 ft. Diam 4" in. Type PVC
12. Method of construction Rotary Drilled
    drilled, dug, driven, bored, jetted, etc.
13. Date started 3 (Month) 30 (Day) 87 (Year)
14. Date completed 4 (Month) 8 (Day) 87 (Year)
15. Depth to water 115' ft. (If flowing well, so state.)
16. Describe point from which depth measurements were made, and give sea-level elevation if available Ground Level.
17. If flowing well, state method of flow regulation: Static
18. Remarks: _____

DO NOT WRITE IN THIS SPACE
OFFICE RECORD
Registration No. 55-515558
Received _____ By _____
Entered ENTERED MAY 06 1987 By _____
File No. A(2-2)22cac

LOG OF WELL

Indicate depth at which water was first encountered, and the depth and thickness of water bearing beds. If water is artesian, indicate depth at which encountered, and depth to which it rose in well.

From (feet)	To (feet)	Description of formation material
0	140'	Sandy Clay / Gravels

I hereby certify that this well was drilled by me (or under my supervision), and that each and all of the statements herein contained are true to the best of my knowledge and belief.

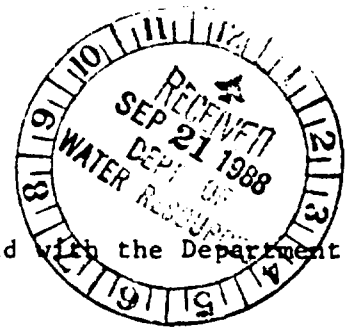
Driller Gabriel R. Escamilla II
Name

3737 E. Broadway Rd
Address

Phx AZ 85036
City State Zip

Date 5-4-87

STATE OF ARIZONA
DEPARTMENT OF WATER RESOURCES
99 EAST VIRGINIA AVENUE
PHOENIX, ARIZONA 85004



WELL DRILLER REPORT

This report should be prepared by the driller in all detail and filed with the Department within 30 days following completion of the well.

1. Owner GROUNDWATER TECHNOLOGY, INC.
Name
607 S. 48TH ST #103 TEMPE, AZ. 85281
Mailing Address

2. Driller LAYNE ENVIRONMENTAL
Name
12302 RIGGS ROAD CHANDLER, AZ 85249
Mailing Address

3. Location of well: T2N R2E SEC 22 SW¼ NE¼ SW¼

4. Permit No. 55-521984 (if issued)

DESCRIPTION OF WELL

5. Total depth of hole 135 ft.

6. Type of casing PVC

7. Diameter and length of casing 4 in. from 0 to 135, ____ in from ____ to ____.

8. Method of sealing at reduction points N/A

9. Perforated from 105 to 135, from ____ to ____, from ____ to ____.

10. Size of cuts .020 Number of cuts per foot 45

11. If screen was installed: Length 30 ft. Diam 4 in. Type SCH 40 PVC

12. Method of construction DRILLED
drilled, dug, driven, bored, jetted, etc.

13. Date started 8 (Month) 20 (Day) 88 (Year)

14. Date completed 8 (Month) 22 (Day) 88 (Year)

15. Depth to water 117 ft. (If flowing well, so state.)

16. Describe point from which depth measurements were made, and give sea-level elevation if available GROUND

17. If flowing well, state method of flow regulation: ____

18. Remarks: ____

DO NOT WRITE IN THIS SPACE
OFFICE RECORD
REG. NO. 55-521984
File No. A(2-2)22cad
Entered ENTERED SEP26 1988 By ____

DWR-55-6-Rev. 8/85

LOG OF WELL

Indicate depth at which water was first encountered, and the depth and thickness of water bearing beds. If water is artesian, indicate depth at which encountered, and depth to which it rose in well.

From (feet)	To (feet)	Description of formation material
0	50	SILTY SAND & CLAY
50	135	SAND GRAVEL COBBLES

I hereby certify that this well was drilled by me (or under my supervision), and that each and all of the statements herein contained are true to the best of my knowledge and belief.

Driller LAYNE ENVIRONMENTAL
Name

12030 E. RUGGS ROAD
Address

CLARKDALE AZ 86324
City State Zip

Date 9-15-88

STATE OF ARIZONA
DEPARTMENT OF WATER RESOURCES
99 EAST VIRGINIA AVENUE
PHOENIX, ARIZONA 85004

WELL DRILLER REPORT

This report should be prepared by the driller in all detail and filed with the Department within 30 days following completion of the well.

1. Owner City of Phoenix
   Name
   _____
   Mailing Address
2. Driller Western Technologies
   Name
   3737 E. Broadway Rd Phx AZ 85036
   Mailing Address
3. Location of well: City Phx NW Service Ctr
4. Permit No. _____ (if issued)

RECEIVED SEP 10 1987 DEPT OF WATER RESOURCES

DESCRIPTION OF WELL

5. Total depth of hole 150 ft.
6. Type of casing PVC
7. Diameter and length of casing 4 in. from 0 to 150. ____ in from ____ to ____.
8. Method of sealing at reduction points N/A
9. Perforated from — to ____, from ____ to ____, from ____ to ____.
10. Size of cuts .020 Number of cuts per foot ____
11. If screen was installed: Length 40 ft. Diam 4 in. Type PVC
12. Method of construction Rotary
    drilled, dug, driven, bored, jetted, etc.
13. Date started 8 (Month) 20 (Day) 87 (Year)
14. Date completed 8 (Month) 23 (Day) 87 (Year)
15. Depth to water 119' ft. (If flowing well, so state.)
16. Describe point from which depth measurements were made, and give sea-level elevation if available Ground Level
17. If flowing well, state method of flow regulation: Static
18. Remarks: _____

55-518071
A (2-2) 22 C A C

Entered ENTERED SEP 10 1987 By _____

LOG OF WELL

Indicate depth at which water was first encountered, and the depth and thickness of water bearing beds. If water is artesian, indicate depth at which encountered, and depth to which it rose in well.

From (feet)	To (feet)	Description of formation material
0	150	Sandy Clay with gravels

I hereby certify that this well was drilled by me (or under my supervision), and that each and all of the statements herein contained are true to the best of my knowledge and belief.

Driller Gabriel R. Escamilla Jr
Name

3737 E. Broadway Rd
Address

Phx AZ 85036
City State Zip

Date 9-9-87

$11\frac{1}{4}E-7\frac{1}{2}N$

FORM W-8 2M 12-47 JANN-TYLER

LAND DEPARTMENT
WATER DIVISION
STATE OF ARIZONA

REPORT OF WELL DRILLER

Report of Well Driller is required to be made and filed with the State Land Commissioner as required by Section 7, Chapter 12, Senate Bill No. 3, Seventeenth Legislature, First Special Session, 1946. A separate report shall be made for each well and filed within 30 days after completion of the well.

1. Owner Salt River Valley Water Users' (Name)
Water Users' Association Building, Phoenix, Arizona. (Address)

2. Lessee or Operator (Name)
(Address)

3. Driller Roscoe Moss Company (Driller H. C. Cope) (Name)
4360 Worth Street, Los Angeles, California. (Address)

4. Location of well: Twp. 2-N Rge. 2-E Section 25 SW ¼ NW ¼ NW ¼ (10-acre subdivision)

DESCRIPTION OF WELL

5. Total depth of hole 500 ft.

6. Type of casing Hard red steel

7. Diameter and length of casing 20 in. from 0 to 500, ____ in. from ____ to ____, ____ in. from ____ to ____

8. Method of sealing at reduction points Not Reduced

9. Perforated from 200 to 485, from ____ to ____, from ____ to ____, from ____ to ____

10. Size of cuts 5/8 x 4½ Number cuts per foot 10 per 12 inches

11. If screen was installed: Length ____ ft. Diam. ____ in. Type None.

12. Method of construction Drilled Calif Type Cable tool (drilled, dug, driven, bored, jetted, etc.)

13. Date completed July 7, 1950 (Month, Year)

14. Depth to water 73 ft. If flowing well, so state.

15. Describe point from which depth measurements were made, and give sea-level elevation if available Ground Surface.

16. If flowing well, state method of flow regulation

DISCHARGE DATA

17. Well discharge 5/3/51: 1635 GPM (gal. per min. or cu. ft. per sec. or miner's inches.)

18. Method of discharge measurement pitot tube (weir, orifice, current meter, etc.)

19. Drawdown 55 ft.

20. Purpose of use irrigation

21. Place of use: (See 22) Twp. ____ Rge. ____ Section ____ ____ Acres ____ (Legal subdivision)

22. Purpose of use

Twp. ____ Rge. ____ Section ____ ____ Acres ____ (Legal subdivision)

22. If well is part of irrigation system of Irrigation District, Association or Company, omit 23 and give name of project.

Name of Project

(A-2-2):25 bbd

EQUIPMENT DATA

23. Kind of pump turbine (turbine, centrifugal, etc.)

24. Kind of power electric (electric, natural gas, etc.)

25. Horsepower rating of motor 100

DO NOT WRITE IN THIS SPACE
OFFICE RECORD

Received 7/24/50 by kb
Filed ~~7/26/50~~ 9/5/50 by kb
File No. (A-2-2)25 bbd
Cross-referenced (Name) ____ by ____
Cross-referenced (Basin) ____ by ____
Cross-referenced ____ by ____

(See Other Side)

LOG OF WELL

Indicate depth at which water was first encountered, and the depth and thickness of water bearing beds. If water is artesian, indicate depth at which encountered, and depth to which it rose in well.

From (feet)	To (feet)	Description of formation material
0	7	Top soil
7	65	Layers of gravel and clay
65	90	Loose gravel
90	170	Sandy clay
170	480	Caliche clay and gravel
480	500	Cemented sand and gravel

I hereby certify that this well was drilled by me (or under my supervision), and that each and all of the statements herein contained are true to the best of my knowledge and belief.

Driller: Roscoe Moss Company
Name

4360 Worth Street, Los Angeles
Address

Date: July 22, 1950

9½E-7½N

FORM W-3 3M 12-47 JAHN-TYLER

LAND DEPARTMENT
WATER DIVISION
STATE OF ARIZONA

REPORT OF WELL DRILLER

Report of Well Driller is required to be made and filed with the State Land Commissioner as required by Section 7, Chapter 12, Senate Bill No. 3, Seventeenth Legislature, First Special Session, 1945. A separate report shall be made for each well and filed within 30 days after completion of the well.

RECEIVED JAN 24 1949 STATE LAND DEPT. OF ARIZONA

1. Owner Salt River Valley Water Users' Association
Name
Water Users' Building, Phoenix, Arizona.
Address

2. Lessee or Operator
Name
Address

3. Driller Roscoe Moss Company (Driller J.N. Olson)
Name
4360 Worth Street, Los Angeles, California.
Address

4. Location of well: Twp. 2N Rge. 2E Section 27 NW ¼ NW ¼ SE ¼ 9½E-7½N
10-acre subdivision

DESCRIPTION OF WELL

5. Total depth of hole 700 ft.

6. Type of casing Hard red steel

7. Diameter and length of casing 20 in. from 0 to 700 in. from to in. from to

8. Method of sealing at reduction points Not reduced

9. Perforated from 220 to 685 from to from to from to

10. Size of cuts 11/16 Number cuts per foot 10 per 12 inches

11. If screen was installed: Length None. ft. Diam. in. Type

12. Method of construction Drilled Calif Type Cable Tool
drilled, dug, driven, bored, jetted, etc.

13. Date completed December 30, 1948
Month Year

14. Depth to water 80 ft.
If flowing well, so state.

15. Describe point from which depth measurements were made, and give sea-level elevation if available Ground Surface.

16. If flowing well, state method of flow regulation Not flowing.

DISCHARGE DATA

Not Tested.

17. Well discharge 5/3/51: 3300 GPM
gal. per min. or cu. ft. per sec. or miner's inches.

18. Method of discharge measurement pitot tube
weir, orifice, current meter, etc.

19. Drawdown 31 ft.

20. Purpose of use irrigation

21. Place of use: (See 22) Twp. Rge. Section Legal subdivision Acres

22. Purpose of use

Twp. Rge. Section Legal subdivision Acres

22. If well is part of irrigation system of Irrigation District, Association or Company, omit 23 and give name of project.

Name of Project

(A-2-2)27 dbb

EQUIPMENT DATA

23. Kind of pump turbine
turbine, centrifugal, etc.

24. Kind of power electric
electric, natural gas, etc.

25. Horsepower rating of motor 200

DO NOT WRITE IN THIS SPACE
OFFICE RECORD

Received 1-24-49 by ld
Filed 2-7-49 by ld
File No. (A-2-2)27 dbb
Cross-referenced (Name) by
Cross-referenced (Basin) by
Cross-referenced by

(See Other Side)

LOG OF WELL

Indicate depth at which water was first encountered, and the depth and thickness of water bearing beds. If water is artesian, indicate depth at which encountered, and depth to which it rose in well.

From (feet)	To (feet)	Description of formation material
0	4	Sandy loam
4	70	Hard caliche and clay
70	95	Sand and gravel
95	140	Clay and gravel
140	174	Hard clay some gravel
174	205	" " " "
205	250	Hard clay some sticky
250	267	Clay and gravel
267	295	Sand and gravel
295	370	Hard clay
370	412	Sandy clay
412	498	Hard caliche and clay
498	503	Soft sandy clay
503	620	Hard brown clay
620	646	Hard blue clay
646	700	Hard brown clay

I hereby certify that this well was drilled by me (or under my supervision), and that each and all of the statements herein contained are true to the best of my knowledge and belief.

Driller Roscoe Moss Company
Name

4360 Worth Street, Los Angeles, Calif
Address

Date January 6, 1949

9½E-7½N

FORM W-3 SM 12-47 JAHN-TYLER

LAND DEPARTMENT
WATER DIVISION
STATE OF ARIZONA

REPORT OF WELL DRILLER

Report of Well Driller is required to be made and filed with the State Land Commissioner as required by Section 7, Chapter 12, Senate Bill No. 3, Seventeenth Legislature, First Special Session, 1945. A separate report shall be made for each well and filed within 30 days after completion of the well.

RECEIVED JAN 24 1949 STATE LAND DEPT. OF ARIZONA

1. Owner Salt River Valley Water Users' Association
Name
Water Users' Building, Phoenix, Arizona.
Address

2. Lessee or Operator
Name
Address

3. Driller Roscoe Moss Company (Driller J.N. Olson)
Name
4360 Worth Street, Los Angeles, California.
Address

4. Location of well: Twp. 2N Rge. 2E Section 27 NW ¼ NW ¼ SE ¼ 9½E-7¾N
10-acre subdivision

DESCRIPTION OF WELL

5. Total depth of hole 700 ft.

6. Type of casing Hard red steel

7. Diameter and length of casing 20 in. from 0 to 700 in. from to in. from to

8. Method of sealing at reduction points Not reduced

9. Perforated from 220 to 685 from to from to from to

10. Size of cuts 11/16 Number cuts per foot 10 per 12 inches

11. If screen was installed: Length None. ft. Diam in. Type

12. Method of construction Drilled Calif Type Cable Tool
drilled, dug, driven, bored, jetted, etc.

13. Date completed December 30, 1948
Month Year

14. Depth to water 80 ft.
If flowing well, so state.

15. Describe point from which depth measurements were made, and give sea-level elevation if available Ground Surface.

16. If flowing well, state method of flow regulation Not flowing.

DISCHARGE DATA

17. Well discharge Not Tested. 5/3/51: 3300 GPM
gal. per min. or cu. ft. per sec. or miner's inches.

18. Method of discharge measurement pitot tube
weir, orifice, current meter, etc.

19. Drawdown 31 ft.

20. Purpose of use irrigation

21. Place of use: Twp. Rge. Section Acres
(See 22) Legal subdivision

22. Purpose of use

Twp. Rge. Section Acres
Legal subdivision

22. If well is part of irrigation system of Irrigation District, Association or Company, omit 23 and give name of project.

Name of Project

(A-2-2)27 dbb

EQUIPMENT DATA

23. Kind of pump turbine
turbine, centrifugal, etc.

24. Kind of power electric
electric, natural gas, etc.

25. Horsepower rating of motor 200

DO NOT WRITE IN THIS SPACE
OFFICE RECORD

Received 1-24-49 by ld
Filed 2-7-49 by ld
File No. (A-2-2)27 dbb
Cross-referenced (Name) by
Cross-referenced (Basin) by
Cross-referenced by

(See Other Side)

LOG OF WELL

Indicate depth at which water was first encountered, and the depth and thickness of water bearing beds. If water is artesian, indicate depth at which encountered, and depth to which it rose in well.

From (feet)	To (feet)	Description of formation material
0	4	Sandy loam
4	70	Hard caliche and clay
70	95	Sand and gravel
95	140	Clay and gravel
140	174	Hard clay some gravel
174	205	" " " "
205	250	Hard clay some sticky
250	267	Clay and gravel
267	295	Sand and gravel
295	370	Hard clay
370	412	Sandy clay
412	498	Hard caliche and clay
498	503	Soft sandy clay
503	620	Hard brown clay
620	646	Hard blue clay
646	700	Hard brown clay

I hereby certify that this well was drilled by me (or under my supervision), and that each and all of the statements herein contained are true to the best of my knowledge and belief.

Driller Roscoe Moss Company
Name

4360 Worth Street, Los Angeles, Calif
Address

Date January 6, 1949

APPENDIX F

PHOTO DOCUMENTATION

PHOTO LOG

File No.: # 329

Date: 3/29/89

Location: Hills Bros. Chemical

Camera: Minolta SRT 200

Photographer: Dan Williams

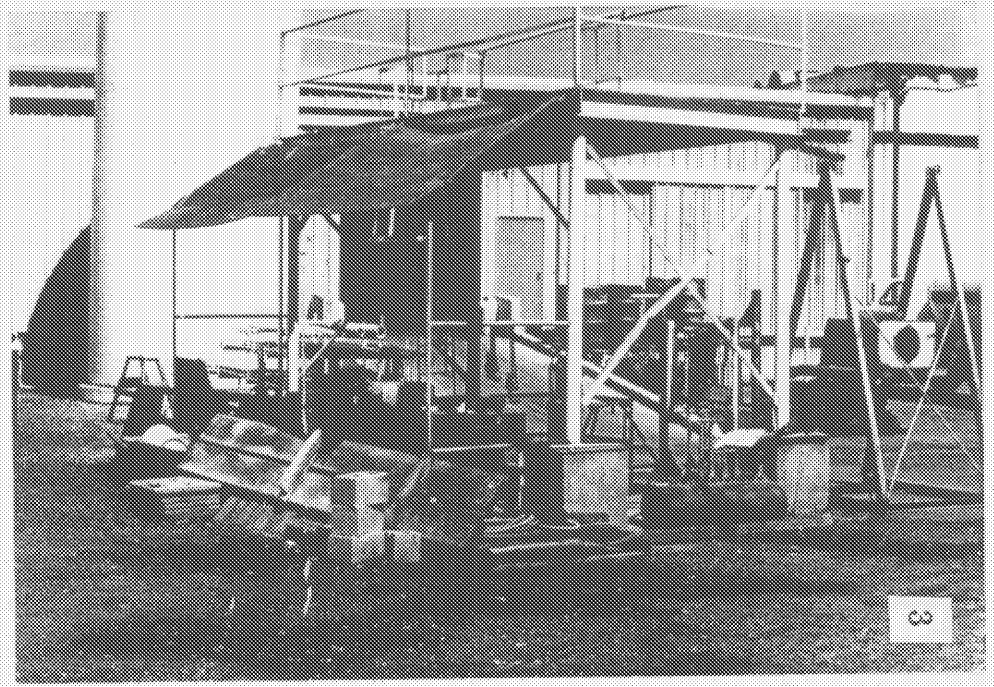
Lens: 55mm

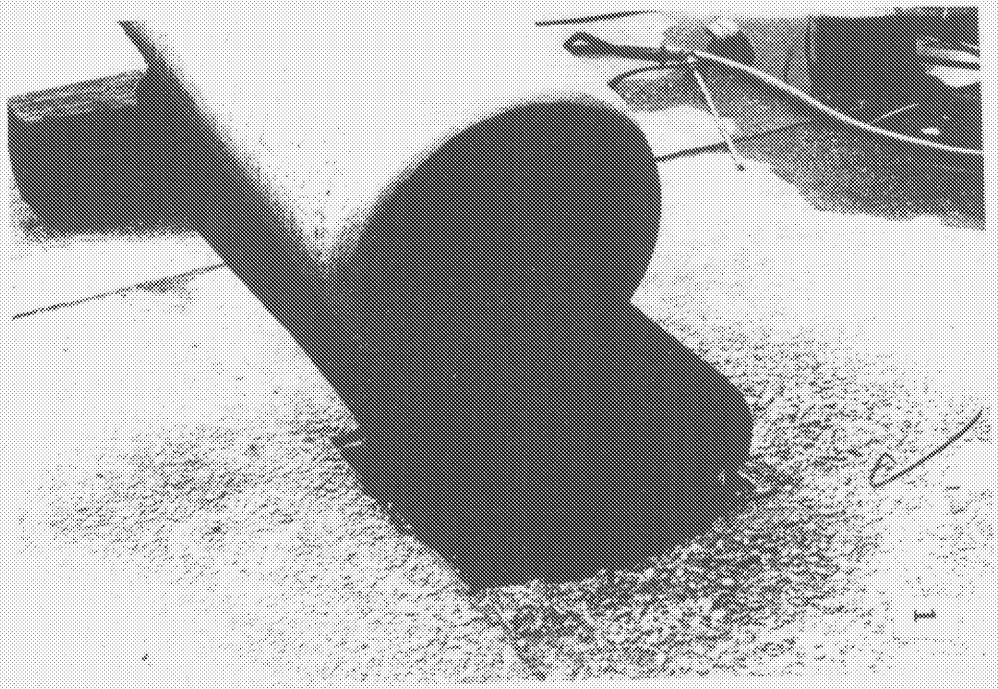
Weather: Sunny 78°F

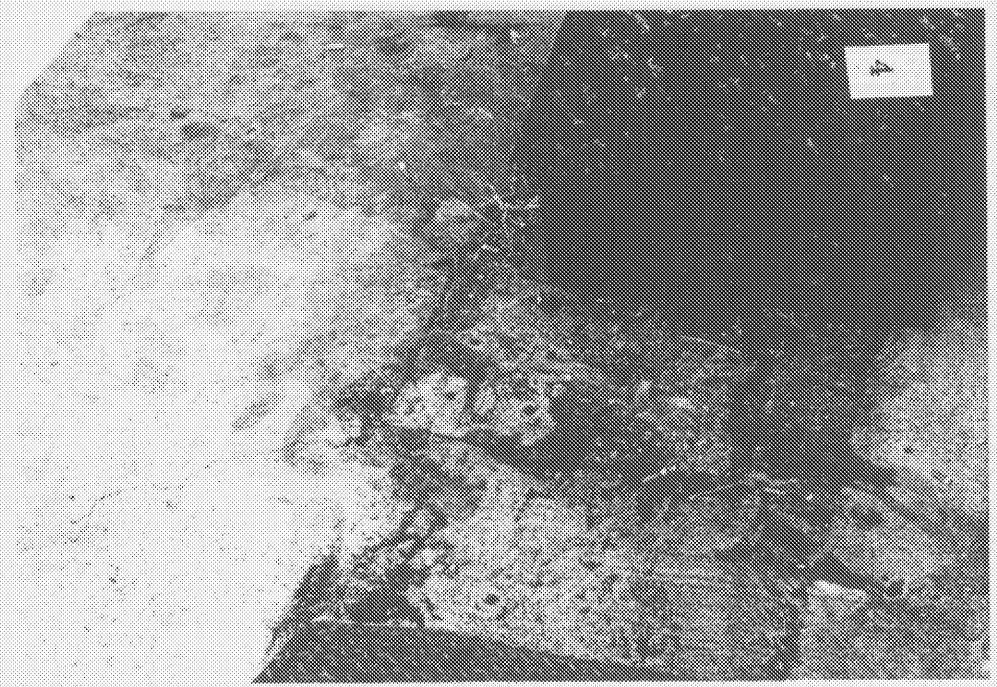
Film: Kodacolor (400)

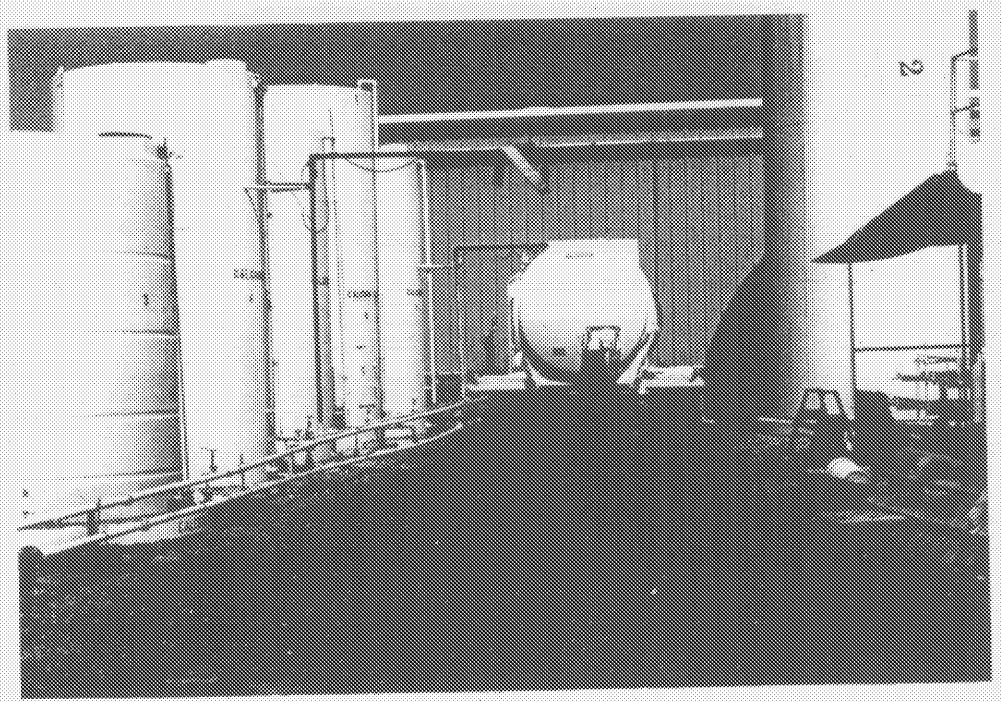
Photo No.	Direction	Time	Description
13	W	11:55am	Calcium CL Tank
14	W	11:56am	Truck Tank CaCL
15	E	12:10pm	CL Tank acid wash area
16	E	12:30pm	Safety shower drain
17	E	12:35pm	Waste water treatment
18	E	12:35pm	Safety shower (solvent area)
19	W	12:45pm	Oil stained soil by gas pump

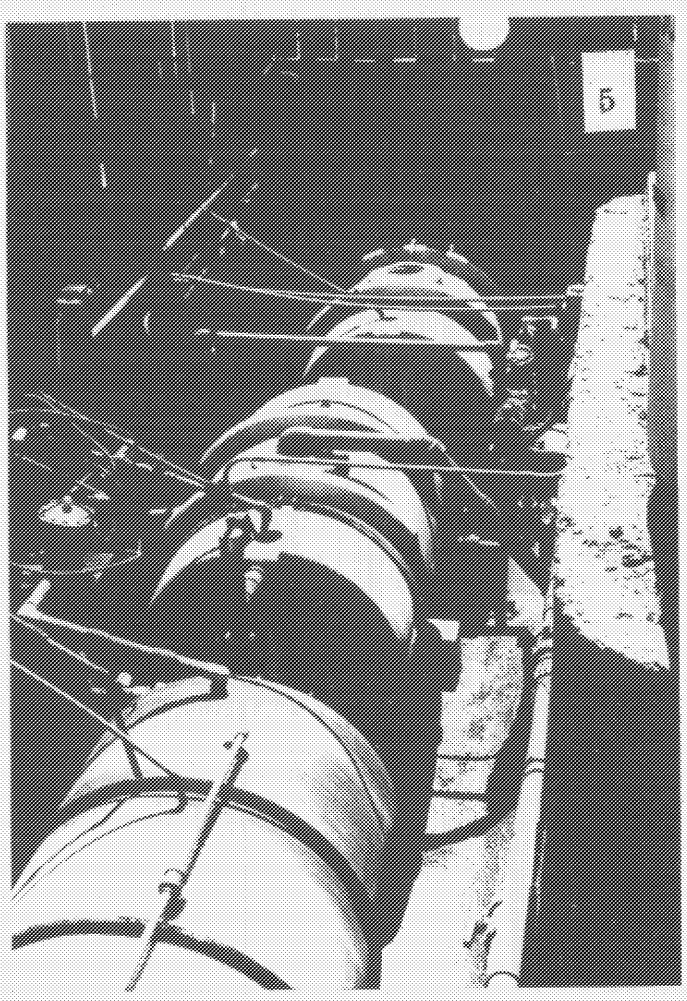
Phrase "Z" H-1
(PHOTO.FRM)







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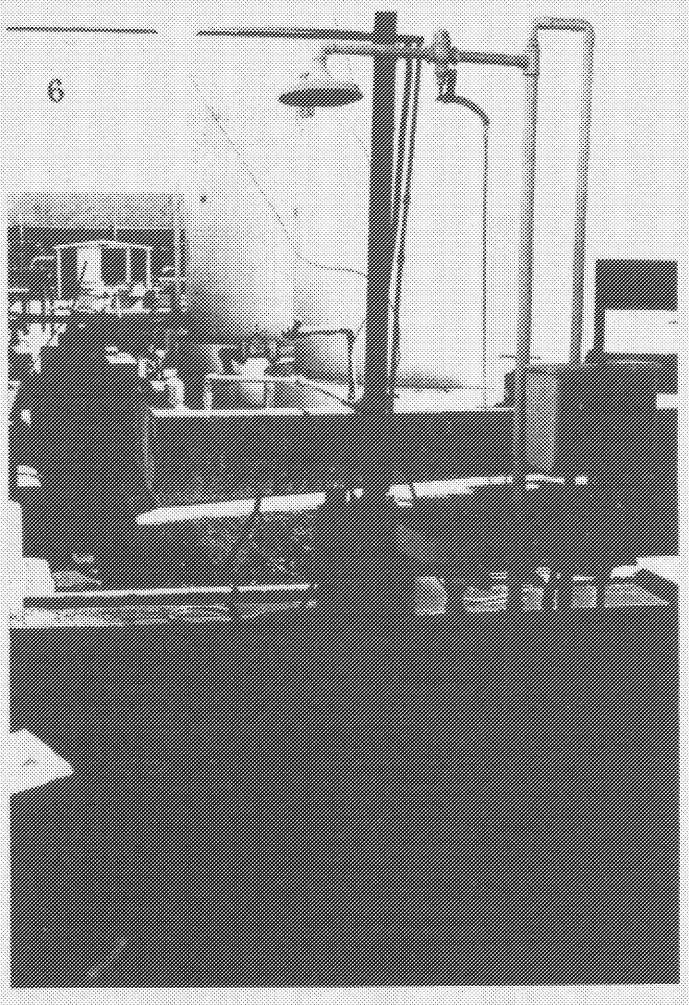
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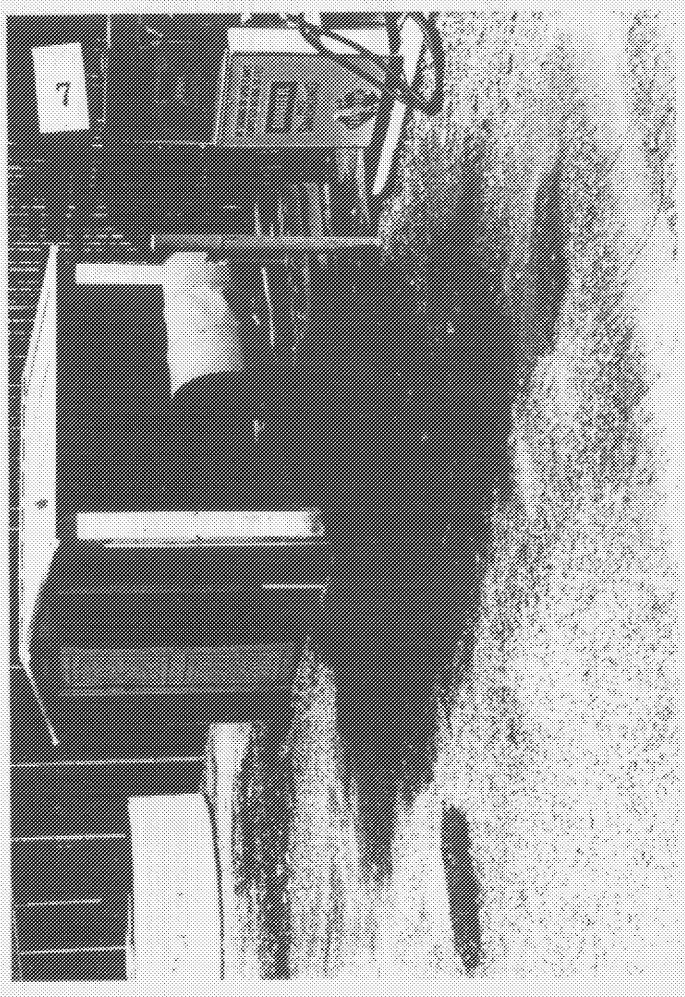
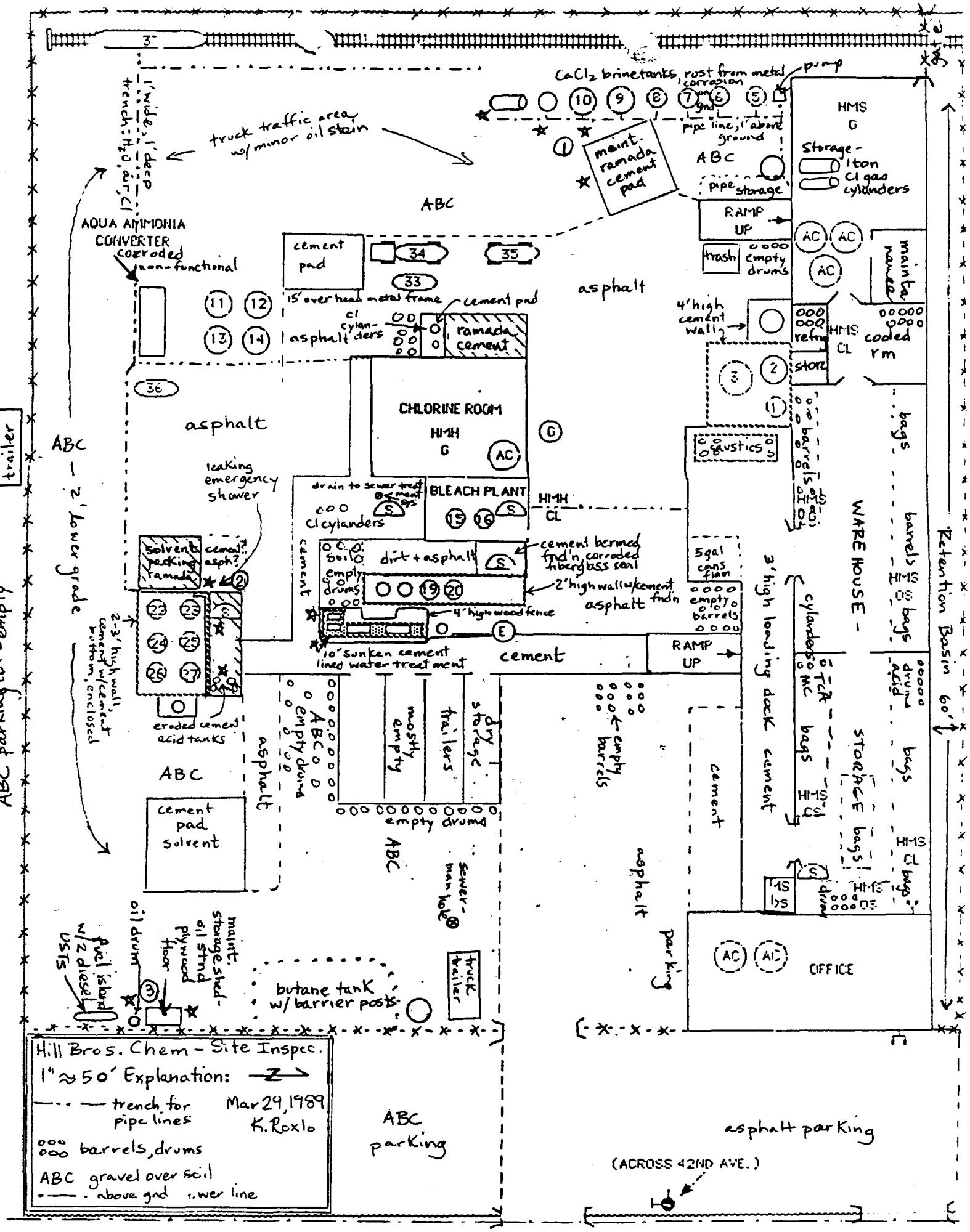

7

APPENDIX G

SITE INSPECTION MAP


3"
1' wide, 1' deep trench: H_2O, dirt, Cl
truck traffic area w/ minor oil stain
$CaCl_2$ brine tanks, rust from metal corrosion
pump
pipe line, 1' above ground
maint. ramada cement pad
ABC
HMS G
Storage - 1 ton Cl gas cylinders
pipe storage
RAMP UP
AQUA AMMONIA CONVERTER corroded non-functional
cement pad
asphalt
trash
empty drums
maint. ramada
15' overhead metal frame
Cl cylinders
ramada cement
4' high cement wall
refrig
HMS CL
cooled rm
store
CHLORINE ROOM
HMH G
bags
barrels HMS
trailer
ABC - 2' lower grade
leaking emergency shower
drain to sewer treatment system
BLEACH PLANT
HMH CL
Cl cylanders
WAREHOUSE
Solvent parking ramada
cement? asph?
cement bermed fnd'n, corroded fiberglass seal
dirt + asphalt
empty drums
2' high wall w/ cement fnd'n
5 gal cans flam
empty barrels
cylinders 50 MC
TCR
4' high wood fence
10' sunken cement lined water treatment
RAMP UP
3' high loading dock cement
2-3' high wall, cement bottom, enclosed
eroded cement acid tanks
ABC parking lot - empty
ABC
empty drums
mostly empty
trailers
dry storage
empty barrels
cement pad solvent
sewer man hole
STORAGE
bags
HMS CL bags
oil drum
maint. storage shed - oil stnd plywood floor
fuel island w/ 2 diesel USTs
butane tank w/ barrier posts
truck trailer
OFFICE
parking
Retention Basin 60'
Hill Bros. Chem - Site Inspec.
1" ≈ 50' Explanation:
trench for pipe lines
Mar 29, 1989
K. Roxlo
barrels, drums
ABC gravel over soil
above grd sewer line
ABC parking
asphalt parking
(ACROSS 42ND AVE.)